

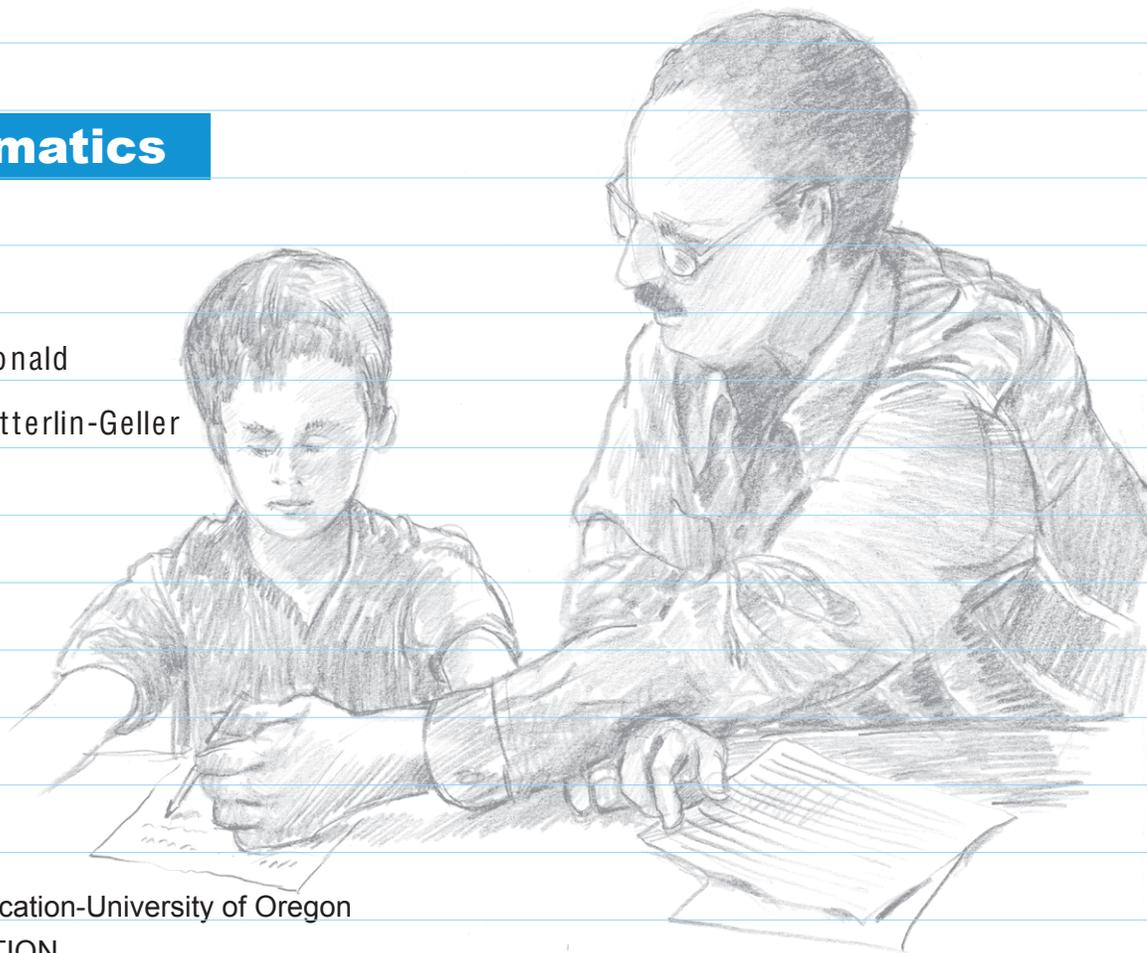
Concept-Based Instruction

Mathematics

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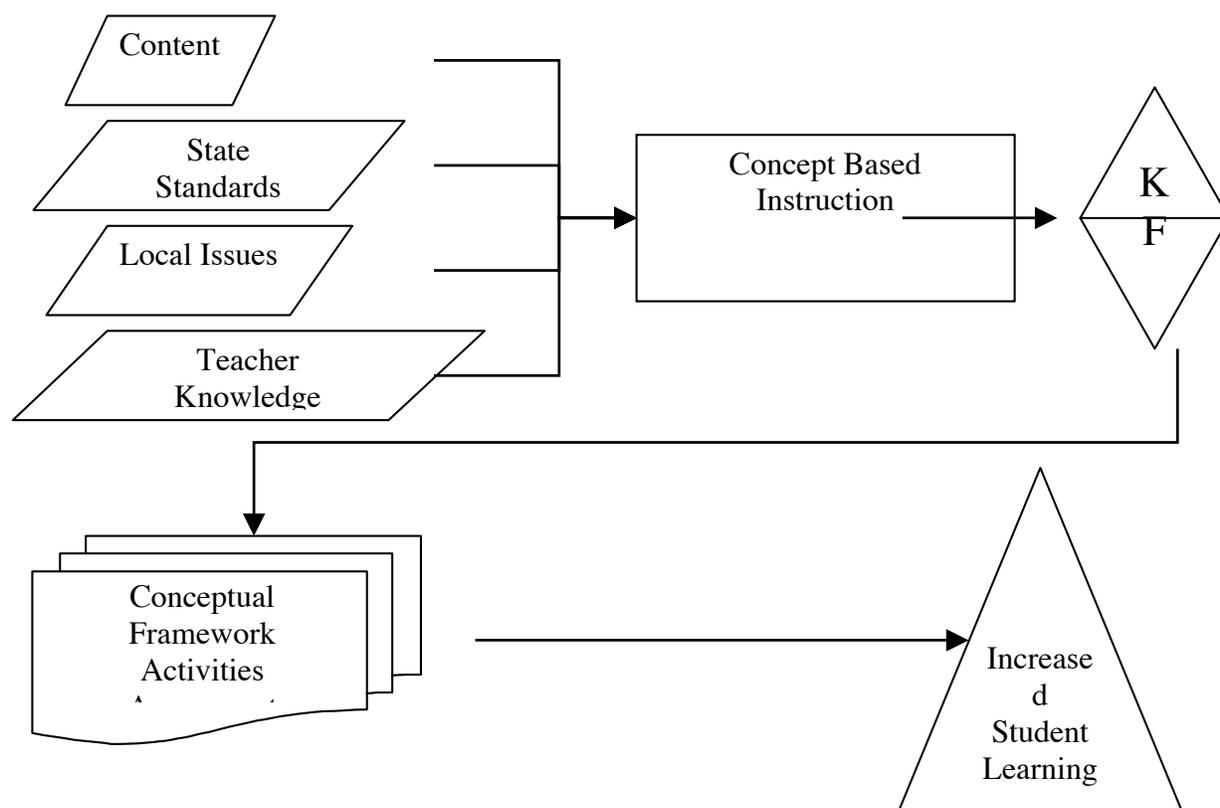
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Introduction

Review of Concept-based Instruction

As our classrooms become more inclusive, the cognitive and affective variability between students increases. Reaching high academic standards within any such classroom is daunting. With all of these constraints, how do we not teach to the lowest common denominator? How can we ensure success for *all* of our students in the same learning environment without individualizing each student's educational program? How can we be both efficient and effective?

Concept-based instruction (CBI) is a model to mediate curriculum, instruction, and assessment into manageable tasks that enables teachers to make appropriate content-specific information decisions to increase student achievement. CBI is conceptualized below.



For students to make sense of the sheer mass of factual data presented in class, they need an overt and easily accessible strategy to not only organize information into a manageable framework but also link it in such a way that a meaningful connection between unique and different situations develops overtly. Cognitive psychologists have found that increasing the structure and organization of presented material will promote proper encoding into memory

storage (Baddely, 1999; Mintzes, Wandersee, & Novak, 1997), and understanding requires relational thinking skills (Bransford, Sherwood, Vye, and Rieser, 1986). Relational thinking denotes the ability of the learner to ‘know what to do’ and ‘why to do it’ and is enhanced when thinking is modeled and activated within an intellectual context (Niedelman, 1991). Such intellectual contexts occur when information is organized so that it clearly reflects the “richness of connections between units of knowledge” (Chi & Koeske, 1983). Overtly organizing and linking information into meaningful units allows for greater amounts of material to be recalled and understood (National Research Council, 2000; Baddely, 1999).

Design.

Concepts provide the bridge to acquiring relational thinking skills by serving as anchors for the cognitive structure. Attributes are critical to conceptual learning in that they represent the rules students use to categorize and distinguish examples from non-examples. Explicitly specifying the attributes is critical to provide students with the organizational rules that enable them to apply information and knowledge to new circumstances, settings, places, events, and eras. For example, a river is an example of a social studies concept that transcends time and place. Its attributes are: (a) a large natural stream of water, (b) flows from higher to lower elevation, and (c) empties into another body of water. Often, the tendency is to jump from the concept label, in this case “river” to specific examples, such as the Nile or Mississippi. A non-example is a creek. Though it consists of two attributes of river, as defined here, conceptually it is not a large body of water. Attributes help to avoid misrules in learning by providing a fundamental link that is constant across virtually all examples of the concept (Tindal, Nolet, & Blake, 1992).

Delivery.

CBI uses graphic organizers (GOs) as a visual and organizational representation of knowledge forms to communicate relationships between concepts (Tukey, 1990), rather than requiring students to use cognitive resources that they may not possess to extract relationships from text (Robinson, 1998). GOs provide students with a meaningful conceptual framework from which they can activate their prior knowledge to create new schema in learning material (Ausebel, 1968). GOs improve comprehension by activating prior knowledge better and faster than text itself (Dunston, 1992).

Assessment.

Research has repeatedly shown that students with disabilities, non-identified low achieving students, and students at-risk of academic failure do not succeed in factually based assessments (Schulte, Villwock, Whichard, & Stallings, 2001, Prater, XXX), yet these are the most prominent types of assessments used. CBI uses assessments that support the development of critical thinking skills by requiring learners to first acquire and control factual information as a basis for manipulating information in establishing relationships between knowledge forms. The process of acquiring critical thinking skills should be viewed as a continuum of both depth and breadth of declarative content knowledge and procedural problem-solving skills (Tindal & Nolet, 1995). To reflect this continuum, assessment systems should be designed to measure improvement of and be sensitive to all performing students in inclusive general education settings.

Overview of Training Module

This training module is divided into five sections, each of which is designed to give you step-by-step practice in developing a concept-based instructional unit.

- **Instructional Planning and Curriculum Analysis:** How do you figure out what concepts you want students to learn in a given unit? What sort of issues do you need to consider in your planning to make your teaching effective?
- **Instructional Delivery:** How do you design your curriculum to ensure that it is accessible to as wide a range of students as possible? What modifications and graphic organizers make most sense to use—and when does it make most sense to present them—in a particular unit?
- **Independent Activity:** How do you design activities for students to complete independently which help them learn to apply the concepts presented in a particular unit to other situations?
- **Assessment:** How do you design and implement assessments in a way that provides you with feedback you can use to evaluate and improve both student learning and your own instruction?
- **Teacher Reflection:** What sort of questions should you ask yourself at the end of each unit to allow you to continue to improve as a teacher?

Each section first provides you with information about that particular facet of teaching, then presents an in-class practice exercise designed to clarify the concepts and activities you will be using to organize your thoughts in that particular area. Each section concludes with a homework assignment which will allow you to apply concept-based instruction to a unit or units of your own choosing.

After completing this training module, you will be proficient with the process of designing, delivering, and assessing content material conceptually, thus ensuring that *all* students in your classes have been presented information in a way that makes the important concepts in your curriculum transparent. Your curriculum will be aligned with the state standards, and you will have additional resources to enhance your lessons. Finally, you will be proficient in designing and using assessment measures that will inform your teaching and track students' learning to allow for better instructional decision-making.

Section 1:

Instructional Planning and Curriculum Analysis

CLASSROOM EXAMPLE

Key Issues

Concepts and Attributes
Collaborative Teaching
Inclusive Model
Modifications and Accommodations
Scoring Rubrics
Curriculum Resources
Scope and Sequence
Year Long Planning
Student Motivation

Curriculum Material

Textbook

Lappan, G., Fey, J.T., Fitzgerald, W.M., Friel, S.N., and Phillips, E.D., (1998)
Connected Mathematics, Variables and Patterns. Menlo Park, CA, Dale Seymour Publications.

Chapter Summary

The lesson highlighted here explores change as an introduction to Algebra. A bicycle tour is used as the situation illustrating change. The students are shown three ways of depicting change: (1) organizing data in a verbal description, (2) using tables and (3) creating graphs. Students will recognize patterns of change by examining the relationship between two variables.

Representing relationships between variables is the main idea. The goal is that students will use three different types of representations interchangeably. The unit deals with simple linear relationships but provides a foundation for the following units. Application, Connections and Evaluation sections are included at the end of each investigation for student assignments.

The lesson begins by defining variables as quantities that change. Students learn that relationships can be shown using tables, graphs, and equations and that these make up the study of Algebra. The lesson focuses on familiar things that change. Using data from commonplace experience, students are introduced to four steps to graphing:

1. Select two variables—dependent and independent.
2. Select an axis for each variable—dependent on the y and independent on the x.
3. Select a scale for each axis.
4. Plot the data points.

Prerequisite Skills

Access skills needed by students include reading (since the instructions, activity, assessment and data provided are in narrative form, writing (in order to answer evaluation

questions), and basic math (such as adding, subtracting, multiplying and dividing). Finally, students should have basic conceptual understanding relating to creating tables.

Concepts, Attributes, Examples and Non-Examples

The main concept in this unit is *organizing and representing data*. In the video the teacher presents the concept *coordinate graphs* with the attributes *variables, data, Cartesian Plane (x/y axes), and labels*.

Variable pair: the categories of information which will be represented on the graph.

Data: the information, divided into categories, which will appear on the graph. This information communicates the results of some information collection effort.

Cartesian plane: the coordinate plane system which includes an x and y axis prescribing the placement of coordinate data divided into two categories.

Labels: descriptive information indicating what the variables are.

CONCEPT DESCRIPTIONS

<i>Concept</i>	<i>Attributes</i>	<i>Examples /Non Examples</i>
Coordinate graph	Variable pair	Variable Example: (4,15), (12,20) Variable Non example: hours
	Data	Data Example: miles/hour jumping jacks/hour
	Cartesian plane (x/y axes)	Example: x,y plot Non-Example: pie chart, bar chart
	Labels	Example: 'hours' or 'miles' in hours vs. miles Non-Example: blank or incorrect labels

Summary of Video Planning

Mark Zima, the regular education math teacher, and Kay Zupan, the special education teacher, discuss planning a unit on organizing data for seventh grade pre-algebra students. The school uses an inclusive model: Students of all ability levels are in the same classroom. The school curriculum uses the Connected Mathematics Project, and the lesson is Graphing Change with situational problem solving using many basic math skills. Mark substitutes data familiar to the students for the problem situations in the textbook. Instead of creating problems around a bike tour, he uses data collected at the middle school: class rosters to plot teachers and students for the independent activity and lunches served versus days for the assessment. Understanding how to display data (tables and graphs) is prerequisite knowledge for the study of algebra. The two teachers work together to provide instruction to a wide range of students, from non-readers to talented and gifted. Mark writes assignment sheets designated 7X, 7Y and 7Z assignments (see lesson materials below) to satisfy the needs of different ability students. All students are required to do the 7X assignment and decide whether they go on to do the additional 7Y and 7Z problems. The students are loosely grouped within the classroom by ability. The classroom model is based on collaborative learning. Mark supplements the curriculum with "Drill and Kill " basic math exercises, Accelerated Math, more challenging problems for advanced learners, and

Pioneer Math curriculum written by a 7th grade teacher and students. Mark uses technology in the classroom by presenting the information in the form of a Power Point presentation as students take notes. The students score their own work using a rubric created to check their understanding of the concept and attributes.

Lesson Materials

Assignment Sheet 7X, 7Y and 7Z:

Week: 12/4-8/2000		Unit: Variables & Patterns			
Class: 7 th AM+PM Math		Objective: Manipulate, organize & analyze data			
Day:	B	A	B	A	B
	Monday 4	Tuesday 5	Wednesday 6	Thursday 7	Friday 8
X	<ul style="list-style-type: none"> - Independent & Dependent Variables - "Basic Rules for Graphing" - Q 2, 10 - pp 27 & 31 - Check for Understanding 	X	<ul style="list-style-type: none"> - Review Monday's concepts - Activity: Organize & represent class size data (by class & total) 	X	<ul style="list-style-type: none"> - Assessment: Organize, Represent, and Analyze Shasta Data - Score meless with rubric
Y	<ul style="list-style-type: none"> - Q 1, 4, 6 - pp 26-30 	X	<ul style="list-style-type: none"> - Represent data by gender - Q 8, 11 - pp 31, 33 	X	<ul style="list-style-type: none"> - Time remaining, Do Problems 2.1, 2.2, 2.3, 2.4 & 2.5, pages

State Standards Alignment

The content presenting coordinate graphs aligns with these Oregon State Benchmarks:

1. Benchmark 3 Common Curriculum Goal- Statistics and Probability: Interpretation of Data. Students create tables, charts, and graphs in order to display data. Students will be able to read, interpret and analyze data from these types of displays.
2. Benchmark 3 Common Curriculum Goal- Algebraic Relationships: Representations of Mathematical Relationships. Students describe relationships using tables and graphs. Students recognize, analyze and explain relationships-patterns and sequences among quantities.
3. Benchmark 3 Common Curriculum Goal- Mathematical Problem Solving: Conceptual Understanding and Processes and Strategies. Students use pictures, models, diagrams, and symbols to illustrate math concepts in problems, and use graphic models in problem solving.

Source: *Oregon Standards*, spring 2001 Oregon Dept. of Ed.

NCTM Standards Alignment

The content aligns with these National Council of Teachers of Mathematics Standards:

Content standards:

1. Mathematics as problem solving. Each Investigation presents problems to be solved.
2. Mathematics as communication. The content uses representations like graphs and tables to communicate solutions .
3. Mathematics as reasoning. The content uses problem situations to reason information to collect and organize; students must use information to support solutions.

Process standards: Algebra.

Source: National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Reston,VA.

Accommodations and Modifications

Students may need to:

- be given graphic organizers, which are partially to completely filled in.
- have the directions or problems read to them.
- receive data that is highlighted or masked to help them identify the pertinent data.
- be provided with pre-made graph paper with the X and Y-axis labeled.

High achieving students may need more challenging problems that require advanced critical thinking skills and higher order intellectual operations.

Additional Resources

Books

American Psychological Association. (2001). *Publication Manual of the American Psychological Association*. Washington, D.C.: American Psychological Association.

Cleveland, W.S. (1985). *The Elements of Graphing Data*. Monterey, CA: Wadsworth.

- Cuoco, A.A., Curio, F.R. (2001). *The Roles of Representation in School Mathematics*. Reston, VA: National Council of Teachers of Mathematics.
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- Greenes, C., & Findell, C. (1999). Developing students' algebraic reasoning abilities. In L.V. Stiff (Ed.), *Developing mathematical reasoning in grades K-12* (pp. 127-137). Reston, VA: National Council of Teachers of Mathematics.
- Grouws, D. A. (Ed.). (1992). *Handbook of Research on Mathematics Teaching and Learning*. New York: Macmillan Publishing Co.
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- National Council of Teachers of Mathematics. (1997). Algebraic thinking: (Focus issue). *Mathematics Teacher*, 90(2).

Niemi, D. (1996) Assessing conceptual understanding in mathematics: Representation, problem solution, justification, and explanation. *The Journal of Educational Research*, 89(61), pp. 351-362.

Niemi, D. (1996). A fraction is not a piece of pie: Assessing exceptional performance and deep understanding in elementary school mathematics. *Gifted Child Quarterly*, 23(2), pp. 70-80.

Schloemer, C.G. (1994). Tips for teaching cartesian graphing: Linking concepts and procedures. *Teaching Children Mathematics*, 1(1), 20-23.

Toumasis, C. (1995). Concept worksheet: An important tool for learning. *Mathematics Teacher*, 88(2), 98-100.

Woodward, J., & Howard, L. (1994). The misconceptions of youth: Errors and their mathematical meaning. *Exceptional Children*, 61(2), 126-136.

Websites

Site	Comments
http://www.nsa.gov/programs/mepp/ms/algrst3_2.pdf http://www.nsa.gov/programs/mepp/hs.html	Resource for lesson plans for many activities in detailed description for daily presentation. Example: Students are given data sets and create different types of graphs, they interpret and evaluate the graphs. They look at data and "real world" statistics and are shown how data can be misinterpreted. They are taught to use graphing calculators. Teaches box and whisker plots and bar graphs in middle school and coordinate graphs in high school.
http://www.apa.org/	American Psychological Association. (2001). Publication Manual of the American Psychological Association. Washington, D.C.: American Psychological Association
http://www.mth.msu.edu/cmp/	Connected Mathematics website, information and reviews of the curriculum.
http://www.nctm.org/	National Council of Teachers of Mathematics
http://www.nctm.org/jrme/issues/2001/03/124-158.html	Journal Article: Making Sense of Graphs: Critical Factors Influencing Comprehension Instructional Implications . Susan N. Friel, University of North Carolina at Chapel Hill, Frances R. Curcio, Queens College of the City University of New York, George W. Bright, University of North Carolina at Greensboro. Abstract: Our purpose is to bring together perspectives concerning the processing and use of statistical graphs to identify critical factors that appear to influence graph comprehension and to suggest instructional implications. After providing a synthesis of information about the nature and structure of graphs, we define graph

http://www.theteacherscorner.net/math/graphing/index.htm	The Teacher's Corner—teacher resources—lesson plans. Resource for books on teaching graphing that integrate literature and math. Provides links to many other sources for materials, lesson plans, games and classroom activities and websites.
http://www.illuminations.nctm.org/imath/	i-Math Investigations are ready-to-use, online, interactive, multimedia math investigations. Complete i-Maths include student investigations, teacher notes, answers, and related professional development activities.
http://illuminations.nctm.org/lessonplans/6-8/cartesian/	NCTM Illuminations: Cartesian Graphing Tips for Teaching Cartesian Graphing: Linking Concepts and Procedures.
http://www-history.mcs.st-and.ac.uk/history/Mathematicians/Descartes.html	Biography of Rene Descartes
http://www.iit.edu/~smile/ma8709.html	Graphing game . A lesson by Thomas Lalagos, introducing the graphing of ordered pairs on the cartesian plane. From the Recreational and Creative Math section of a collection of almost 200 single concept lessons by the Science and Mathematics Initiative for Learning Enhancement.
http://score.kings.k12.ca.us/lessons/graphing.html	Coordinate graphing.. A teacher lesson plan by Laurie L. Dunbar with links to student activity pages. Learn the basics of coordinate graphing and practice plotting points on the coordinate axis. Aligned to the California State Standards. From the Schools of California Online Resources for Educators SCORE Mathematics Lessons.
	comprehension. We consider 4 critical factors that appear to affect graph comprehension: the purposes for using graphs, task characteristics, discipline characteristics, and reader characteristics. A construct called graph sense is defined. A sequence for ordering the introduction of graphs is proposed. We conclude with a discussion of issues involved in making sense of quantitative information using graphs and ways instruction may be modified to promote such sense making. Reference page lists many books on graphing
www.middleweb.com/Graphing.html	Teaching graphing in middle school math. Creative ways to teach graphing.
http://hometown.aol.com/joemercer/Gxy.htm	Graphing lessons, related to article "Teaching Graphing concepts with Graphing Calculators" Mathematics Teacher 88m (April 1995): 268

In-Class Practice Exercise

Key Issues

Considering the content you intend to cover and the student population you will be addressing, identify important issues to be considered prior to instruction. Consider actions you will need to take when planning this unit.

1.

2.

3.

4.

5.

6.

Curriculum Material

Textbook

Lappan, G., Fey, J.T., Fitzgerald, W.M., Friel, S.N., and Phillips, E.D., (1998)
Connected Mathematics, Comparing and Scaling. Menlo Park, CA: Dale Seymour Publications.

Chapter Summary

Read the following content from the Connected Mathematics textbook Comparing and Scaling: Investigation 1 pages 5-15 and Investigation 3 pages 26-36. Write a one-page summary of the content to be taught.

Investigation 1: Making Comparisons

It's easy to decide which of two numbers is larger or smaller. However, it's not as easy to decide on the 'best' way to explain *how much* larger or smaller one number is than another—especially when one or both of the numbers are fractions. In this unit, you will learn several ways to compare numbers.

1.1 Writing Ads

In their advertisements, companies often refer to surveys to show that people prefer their product over a competitor's product. An ad for Bolda Cola starts like this:

**Which cola do you like better?
Bolda Cola or Cola Nola?
Take the cola taste test?**

To complete the ad, Bolda Cola wants to report the results of their taste tests. A copywriter from the advertising department has proposed four possible concluding statements.

In taste tests, people who preferred Bolda Cola outnumbered those who preferred Cola Nola by a ratio of 3 to 2.

In taste tests, people who preferred Bolda Cola outnumbered those who preferred Cola Nola by a ratio of 17,139 to 11,426.

In taste tests, 5713 more people preferred Bolda Cola to Cola Nola.

In taste tests, 60% prefer Bolda Cola to Cola Nola.

Problem 1.1

- A. Describe what you think each of the four statements means. Explain how each shows a comparison. Be sure to tell what is being compared and how it is being compared.
- B. Is it possible that all four advertising claims are based on the same survey data? Explain your answer.
- C. Which comparison do you think is the most accurate way to report the survey data? Why?
- D. Which comparison do you think would be the most effective advertisement for Bolda Cola? Why?

Problem 1.1 Follow-Up

Write two more statements comparing the popularity of the two colas. Explain each statement you write.

Targeting an Audience

Many middle and high school students work delivering papers, mowing lawns, or baby-sitting. Students who have money of their own to spend are a common target audience for radio and television ads. Information about the amount of time students spend watching television or listening to the radio influences how companies who want to sell products to them spend their advertising dollars. Advertisers want to know which type of media will best get their message across.

Problem 1.2

A survey of 100 students at Neilson Middle School found that 60 students prefer watching television in the evening and 40 prefer listening to the radio.

- A. Read the statements below about how Neilson students prefer to spend their evenings. Tell whether each statement accurately reports the results of the survey. Explain your answers.
1. 6 out of 10 students prefer television to radio.
 2. Students prefer radio to television by a ratio of 4 to 6.
 3. Students who prefer television outnumber those who prefer radio by 20.
 4. Students who prefer television outnumber those who prefer radio by a ratio of 3 to 2.
 5. The number of students who prefer watching television is 1.5 times the number who prefer listening to radio.
 6. 40% of the students prefer radio to television.
 7. $\frac{3}{5}$ of the students prefer television to radio.
- B. If you were writing a paper to convince local merchants that they would reach more students by advertising on the radio than on television, which of the above statements would you use? Why?
- C. Imagine that you are the advertising director for a television station in the town where Neilson is located. You have been asked to prepare a report for a meeting between your ad department and a large local skateboard manufacturer. Which accurate statement from above would you use to try to convince the manufacturer to advertise on your station? Why?

Problem 1.2 Follow-Up

Conduct a quick survey in your class to find out how many students prefer watching television in the evening and how many prefer listening to the radio. Record the results in a table.

1. For each statement in part A on page 7, write a similar statement about your class data.
2. In what ways is your class data similar to the Neilson data? In what ways is your data different?
3. You may have heard people talk about an interest group manipulating data to promote their cause. This doesn't mean they used incorrect data, but that they made careful decisions about which data to use and how to represent the data to support their cause. How could you manipulate your class data to persuade local merchants to advertise on radio rather than on television?

Getting the Message Across

Camping is a popular activity in the United States. Every year, millions of families visit national, state, and local parks to enjoy the wonders of nature. While some of these visitors "rough it" in tents, many prefer cabins, trailers, and campers—bringing a few comforts of home to the wilderness. The following table gives data on the popularity of camping for several age groups in the United States. It shows the number of people in each age group who go camping at least twice a year. The numbers in the table are projections based on data from a sample of 10,000 households.

	Ages 18—24	Ages 25—34
Total in the age group	26,650,000	41,808,000
Number who camp	619,800	1,019,700

Source: National Sporting goods Association, as found in the Statistical Abstract of the United States 1995. Published by the Bureau of the Census, Washington, D.C. p.257

Problem 1.3

Suppose you were asked to write a news story about the popularity of camping in the United States based on the data in the table.

- A. What headline would you use for your story? What would your first sentence be?
- B. Write five statements you could use in your story to compare the popularity of camping among people in the three age groups. In each statement, be clear about which groups you are comparing. Your comparisons should be specific and based on mathematics.

Problem 1.3 Follow-Up

According to the data, what percent of people from age 18 to 34 go camping at least twice a year?

Applications

In 1 - 4, use the following information: Oksana surveyed her class to find out how students spend their time over a weekend. On Friday, she distributed a list of activities and asked her classmates to keep track of how many hours they spent from midnight on Friday to midnight on Sunday doing each activity. On Monday, she collected the data and found the mean number of hours the students spent in each category She put her results in a table.

Weekend Activities	
Activity	Average number of hours
Sleeping	18.4 hours
Eating	3.5 hours
Recreation	7.4 hours
Talking on the phone	0.6 hours
Watching television	3.7 hours
Doing chores or homework	4.7 hours
Other	9.7 hours

In 1 - 3, use Oksana’s data to fill in the blanks to create an accurate statement.

1. In comparing time spent watching television to recreation time, students spent more time _____ than _____ by a ratio of _____ to _____.

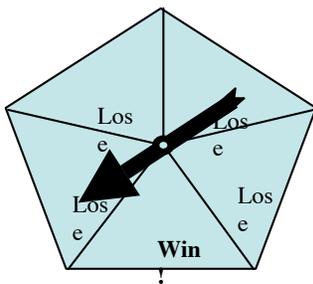
2. The number of hours spent watching television is about _____ times the number of hours spent doing chores or homework.

3. In comparing time spent eating and sleeping to time spent in recreation and watching television, _____ percent of the weekend was spent _____, and _____ percent was spent _____.

4. Make up a comparison like those in questions 1—3 about the data in Oksana’s table. Tell why you think your comparison is interesting.

Connections

5. Below is a drawing of the spinner used in the Big Wheel game at the Waverly Middle School fun night. The chart shows the data from 236 spins of the Big Wheel.

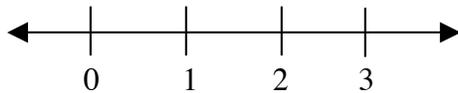


Spin Results	
Win	Lose
46	190

- a. Compare the number of wins to the number of losses in three ways: using ratios, using percents, and using differences.

- b. Choose one of the methods of comparison from **part a** (ratios, percents, or differences). Think of a situation in which this method would be an effective way to report the spin results. Explain your reasoning.
- c. If you spun the spinner once, what is the probability that you would win? Explain how you got your answer.
- d. Do the results in the table seem to agree with or contradict the probability statement you made in **part c**?

6. Copy the number line below. Add labels for 0.25, $\frac{6}{8}$, $\frac{13}{4}$ and 1.3.



- 7. Write two fractions with different denominators so that one fraction is less than the other. Tell which fraction is larger.
- 8. Write a fraction and a decimal so that the fraction is greater than the decimal.

In 9 - 11, rewrite the pair of numbers, inserting < or > to make a true statement.

- 9. $\frac{4}{5}$ $\frac{11}{12}$ 10. 2.5 0.259 11. $\frac{13}{4}$ 1.5

Extensions

12. The first row of the table below shows the number of hours visitors spent in federal recreation areas in 1980 and 1990. Some of these federal recreation areas are managed by the National Forest Service. The second row of the table shows how many of the hours from the first row were spent in National Forest Service areas.

Hours Spent in Recreation Areas

	Visitor hours in 1980	Visitor hours in 1990
Federal recreation areas	6,367,000,000	7,567,000,000
National Forest Service areas	2,819,000,000	3,157,000,000

Source: 1980, the U.S. Heritage Conservation and Recreation Service; 1990, the U.S. National Park Service; as found in the *Statistical Abstract of the United States 1995*. Published by the Bureau of the Census, Washington, D.C., p. 251.

- a. Write statements for each year, 1980 and 1990, comparing visitor hours in National Forest Service areas to visitor hours in all federal recreation areas.
- b. Do the statements you wrote show visitor hours in National Forest Service areas growing or declining in comparison to visitor hours in all federal recreation areas? Explain how you got your answer.

13. The table below shows the number of new books and new editions published in several subject areas in 1980 and 1990.

New Books and New Editions		
Subject	Published in 1980	Published in 1990
Art	1691	1262
Education	1011	1039
Fiction	2835	5764
Juvenile	2859	5172
Literature	1686	2049
Total new books and new editions	42,377	46,738

Source: Publishers Weekly, as found in the Statistical Abstract of the United States 1995. Published by the Bureau of the Census, Washington, D.C., p.580.

- Compare the change in the number of new books and new editions published in 1980 and 1990 in each subject area by computing differences.
- For 1980, find the percent of all new books and new editions that were published in each subject area.
- For 1990, find the percent of all new books and new editions that were published in each subject area.
- Describe how the percent of books published in each subject area changed from 1980 to 1990.
- Which method of comparison (differences or percents) would you choose if you were a librarian making a case for an increased budget for fiction books in your library? Explain your reasoning.
- Which method of comparison would you choose if you were a reporter writing an article about trends in the book-publishing business over time? Explain your reasoning.

Investigation 3: Comparing by Using Ratios

Another useful way to compare numbers is to form ratios. You looked at ratios informally in Investigation 1. In this investigation, you will learn to form and interpret ratios in order to make comparisons. Let's look at some examples of statements containing ratios.

In taste tests, people who preferred Bolda Cola outnumbered those who preferred Cola Nola by a ratio of 3 to 2.

The ratio of boys to girls in our class is 12 boys to 15 girls.

The ratio of boys to students in our class is 12 boys to 27 students.

The ratio of kittens to cats in our neighborhood is 1/4.

The sign in the hotel lobby says 1 dollar Canadian: 0.85 dollars US.

A paint mixture calls for 5 parts blue paint to 2 parts yellow paint.

In these examples, ratios are written in three different ways: using the word “to,” as in 5 to 8; using the “:” symbol, as in 5:8; and using fraction notation, as in $\frac{5}{8}$. All three forms—5 to 8, 5:8, and $\frac{5}{8}$ —mean that for every five of the first item, there are eight of the second item.

Think about this!

Look over the examples above. Think about what is being compared in each ratio.

- Is the ratio comparing two parts of the same whole? This is called a *part-to-part* ratio.
- Is the ratio comparing a part of a whole to the whole? This is called a *part-to-whole* ratio.
- Is the ratio comparing two different kinds of things?

Many real-world problems involve scaling a ratio up or down to find an *equivalent ratio*. This requires finding larger or smaller numbers with the same relationship as the numbers in the original ratio. For example, the ratios 2:3, 4:6, and 6:9 are all equivalent. Suppose a shade of purple paint is made using 2 parts red paint to 3 parts blue. You would get the same shade of purple whether you mixed 2 gallons of red paint to 3 gallons of blue paint, 4 gallons of red paint to 6 gallons of blue paint, or 6 gallons of red paint to 9 gallons of blue paint.

3.1 Mixing Juice

Every year the seventh grade students at Langston Hughes School go on an outdoor-education camping trip. During the weeklong trip, the students study nature and participate in recreational activities. Everyone pitches in to help with the cooking and cleanup.

Arvind and Mariah are in charge of making orange juice for all the campers. They make the juice by mixing water and orange juice concentrate. To find the mix that tastes best, Arvind and Mariah decided to test some recipes on a few of their friends.

Problem 3.1

Arvind and Mariah tested four juice mixes.

Mix A
3 cups cold water
2 cups concentrate

Mix B
4 cups cold water
1 cup concentrate

Mix C
4 cups concentrate
8 cups cold water

Mix D
3 cup concentrate
5 cups cold water

- Which recipe will make juice that is the most “orangey”? Explain your answer.
- Which recipe will make juice that is the least “orangey”? Explain your answer.
- Assume that each camper will get $\frac{1}{2}$ cup of juice. For each recipe, how much concentrate and how much water are needed to make juice for 240 campers?

Problem 3.1 Follow-Up

- How did you use ratios in solving Problem 3.1?
- For each recipe, how much concentrate and how much water is needed to make 1 cup of juice?

3.2 Helping the Cook

The camp cook must buy enough ingredients for all the meals he intends to prepare during the week. One of the cook's most popular meals is spaghetti. The spaghetti recipe he uses calls for canned tomatoes. The CannedStuff store has large cans of tomatoes on sale, five cans for \$4.00. The cook says he can make sauce for five to six campers from each can of tomatoes.

Problem 3.2

Suppose you are assigned to help the cook order supplies.

- A. How many cans of tomatoes would you advise the cook to buy to make spaghetti for the 240 campers? Explain your answer.
- B. How much would these cans of tomatoes cost altogether?

Problem 3.2 Follow-Up

1. At the EatMore grocery store, you can buy seven cans of tomatoes for \$6.00. The cans are the same size as the cans at CannedStuff. Are the tomatoes at EatMore a better buy than the tomatoes at CannedStuff? Explain your answer.
2. Gus was trying to figure out how to think about the EatMore price of seven cans of tomatoes for \$6.00. He divided 7 by 6 and got 1.16666667. He then divided 6 by 7 and got 0.85714286. What does each of these numbers mean in the context of seven cans of tomatoes for \$6.00?

3.3 Sharing Pizza

On the last day of camp, the cook served pizza. The camp dining room has two kinds of tables. A large table seats 10 people, and a small table seats 8 people. The cook tells the students who are serving dinner to put four pizzas on each large table and three pizzas on each small table.

Problem 3.3

- A. If the pizzas at a table are shared equally by everyone at the table, will a person sitting at a small table get the same amount of pizza as a person sitting at a large table? Explain your reasoning.
- B. The ratio of large tables to small tables in the dining room is 8 to 5. There are exactly enough seats for the 240 campers. How many tables of each kind are there?

Problem 3.3 Follow-Up

1. How were ratios helpful in thinking about the problem?
2. How many pizzas will the cook need in order to put four on each large table and three on each small table?

Applications

1. At camp, Miriam learned how to use a pottery wheel. She can make 3 bowls in 2 hours. How long will it take her to make a set of 12 bowls?
2. The camp cook's favorite recipe for salad dressing calls for 2 tablespoons of lemon juice and 6 tablespoons of olive oil. If the cook wants to make a large batch of salad dressing using 3 cups of oil, how much lemon juice will he need? (There are 16 tablespoons in 1 cup.)
3. You need to buy several dozen avocados to make guacamole dip for a party. At the co-op, you can buy 7 avocados for \$6.00. At the Cheapy Food Mart, 5 avocados cost \$4.50. At which

store will you get the better buy?

4. Friendly Food Store has Cocoa Blast cereal on sale this week at a price of \$8.25 for five boxes. Best Food Store is offering the same size box of Cocoa Blast at a price of \$3.50 for two boxes. Which offer gives you the most cereal for your money?
5. In the ads for Bolda Cola from Investigation 1, one possible concluding statement says “by a ratio of 3 to 2” and another says “by a ratio of 17,139 to 11,426.” These ratios are equivalent. Write four other statements containing ratios equivalent to these ratios.
6. At Louis Armstrong School, Ms. Turini’s homeroom has 18 boys and 12 girls.
 - a. What is the ratio of boys to girls in Ms. Turini’s homeroom?
 - b. What is the ratio of girls to boys?
 - c. What is the ratio of boys to students in the class?
 - d. What is the ratio of students in the class to boys?
7. Lakisha is attending a party at her favorite pizza parlor. Three tables are set up for the guests. After the pizzas are placed on the tables, the guests are asked to sit anywhere they choose. The small table has 5 seats and 2 pizzas, the medium table has 7 seats and 3 pizzas, and the large table has 12 seats and 5 pizzas. The pizzas at each table will be shared equally. Where should Lakisha sit if she is very hungry?
8. Elena works in the animal nursery at the county zoo. The baby monkeys eat a mixture of high-fiber nuggets and high-protein formula. Last month, Elena mixed 4 cups of nuggets and 6 cups of high-protein formula to make the food for each feeding. This month, the monkeys can eat more at each feeding.
 - a. If Elena uses 8 cups of nuggets in the new mix, how much high-protein formula should she use?
 - b. If Elena uses only 6 cups of nuggets, how much formula should she use?
 - c. If Elena uses 7.5 cups of formula, how many cups of nuggets should she use?

In 9 - 11, use the apple juice recipes below.

Mix W
3 cups concentrate
4 cups cold water

Mix X
3 cup concentrate
5 cups cold water

Mix Y
6 cups concentrate
9 cups cold water

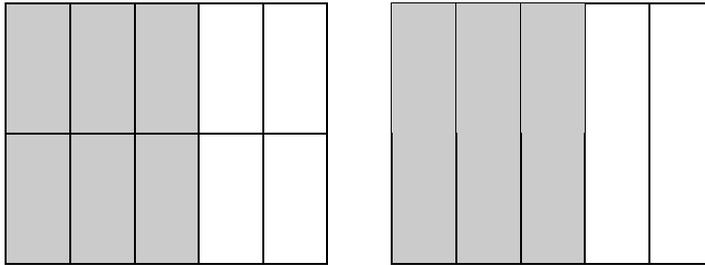
Mix Z
5 cups concentrate
8 cups cold water

9. a. If you made a single batch of mix W what fraction of the batch would be concentrate?
Answer the same question for mixes X, Y, and Z.
 - b. Rewrite your answers to part a as percents.
10. Which recipe would make the most “appley” juice?

11. If you made only 1 cup of mix W, how much water and how much concentrate would you need? Answer the same question for mixes X, and Z.

Connections

12. The diagram below illustrates the equivalence of two fractions. Find the missing numerator.



$$?/10 = 3/5$$

In 13 - 18, replace the question mark with a number to make a true statement.

13. $3/15 = ?/30$ 14. $1/2 = ?/20$
 15. $?/20 = 3/5$ 16. $18/30 = ?/15$
 17. $?/15 = 3/5$ 18. $9/15 = 12/?$

19. Illustrate your answer to question 13 by drawing a picture like the one in question 12.

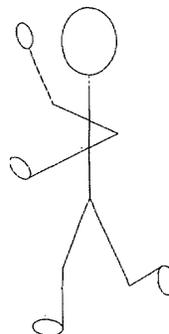
In 20 - 23, replace the question marks with numbers to make true statements.

20. $6/14 = ?/21 = ?/28$ 21. $?/17 = 8/36 = ?/45$
 22. $?/20 = ?/25 = 6/30$ 23. $?/8 = 15/? = 24/32$

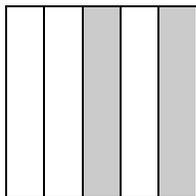
Extensions

24. Here is a drawing of Mr. Stickman.

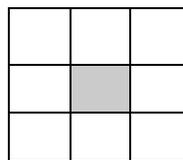
- Draw a picture of Twiggy Stickman. She is $1/2$ as tall as Mr. Stickman.
- Draw a picture of Branchy Stickman. He is $2/3$ as tall as Twiggy.
- Branchy's height is what fraction of Mr. Stickman's height? Explain your reasoning.
- Use some other form of comparison to rewrite the fraction comparisons in **parts a, b, and c.**



25. a. What fraction of this square is shaded?



b. What fraction of this square is shaded?



- c. Draw a picture to show a fraction with a denominator of 10 that is equivalent to the fraction shaded in **part a**. Tell what fraction of your drawing is shaded.
- d. Draw a picture to show a fraction with a denominator of 27 that is equivalent to the fraction shaded in **part b**. Tell what fraction of your drawing is shaded.
- e. What percent of the square in **part a** is shaded?
- f. What percent of the square in **part b** is shaded?
- g. What is the ratio of the shaded area to the unshaded area in **part a**?
- h. What is the ratio of the shaded area to the unshaded area in **part b**?
- i. The squares in **parts a** and **b** are the same size. What is the ratio of the shaded part of the square in **part a** to the shaded part of the square in **part b**? Be careful—The answer is not 2 to 1.

Mathematical Reflections

In this investigation, you learned about ratios and about using ratios to make comparisons. These questions will help you summarize what you have learned:

1. Explain how to form a ratio and how ratios can be used to compare two numbers. Use examples to help explain your thinking.
 2. What strategy can you use to compare two ratios? Be very specific. Your strategy should allow you to tell whether the two ratios are the same or different. Make up a problem that can be solved by using your strategy.
- In Investigation 2, you used percents to make comparisons. In Investigation 3, you used ratios to make comparisons.
3. The percent of orange concentrate in a juice mix is 60%. What is the ratio of concentrate to water in the mix?
 4. The ratio of concentrate to water in a juice mix is 3 to 5. What percent of the mix is concentrate?

Think about your answers to these questions, discuss your ideas with other students and your teacher, and then write a summary of your findings in your journal.

Concepts, Attributes Examples and Non-Examples

Use the following definitions, explanations, and examples to identify the concepts, attributes, examples, and non-examples from the text passage provided.

- **Concept:** a class of events, names, dates, etc. that share a common set of defining attributes or characteristics. A concept is timeless, universal, abstract and broad, and is usually represented by 1-2 words. When identifying a concept, consider why it is important that students learn this information. This will lead you to a broader vision of the topic and assist in the articulation of the concept.
- **Attribute:** essential element of a concept. Attributes help students gain a deeper understanding of the concept. Once you have identified a concept and several examples, identify the critical characteristics of the concept. To assist in this process, write a dictionary definition of the concept. What defines the concept and is consistent across all examples of the concept? These are the attributes.

CONCEPT EXAMPLE

<i>Concept</i>	<i>Attributes</i>	<i>Examples /Non Examples</i>
Party	Gathering of People	Example: friends, co-workers Non-example: jail inmates
	Distinct Event (particular location, specific time, etc.)	Example: Lava Lounge from 8 – 10 pm Non-example: County Courthouse from 2 – 3 pm
	Activities	Example: eating, dancing, games, talking Non-example: none
	Party Items	Example: stereo, food, decorations Non-example: none

Complete the following chart for the information presented in the content provided.

CONCEPT DESCRIPTIONS

<i>Concept</i>	<i>Attributes</i>	<i>Examples /Non Examples</i>
1		
2		

* Use additional paper if needed.

State Standards Alignment

Describe the alignment of this curriculum with state and national standards. Refer to the Oregon Department of Education’s website for an updated version of the state standards in your grade level and content area. Include as much information as is available.

Common Curriculum Goal	Content Standard	Benchmark Level: _____	Rationale for Including

**Instructional Planning and Curriculum Analysis
Peer Evaluation Form**

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Instructional Planning and Curriculum Analysis plan. Evaluate each section using the criteria provided. Write a positive comment and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Peer Review Evaluation	Points Earned
Key Issues: substantial and significant key issues are unique and relevant to the unit.	/0.5
Positive Comment:	
Areas for Improvement:	
Curriculum Material	/0.5
1. Textbook citation is correctly formatted.	
Positive Comment:	
Areas for Improvement:	/0.5
2. Chapter summary is complete and accurate. Important and relevant information is included.	
Positive Comment:	
Areas for Improvement:	/1
Concept Analysis	
1. Concepts and attributes are clearly identified. Attributes are critical and important for understanding the concept.	/1
Positive Comment:	

Areas for Improvement:	
2. Examples and non-examples are clearly identified and reasonable. Examples help clarify the concept and attributes.	/1
Positive Comment:	
Areas for Improvement:	
State Standards Alignment	
1. Relevant information is provided relating the state standards to the unit.	/0.5
Positive Comment:	
Areas for Improvement:	
2. Curriculum is appropriately aligned with the state standards identified. Rationale for alignment is clear and reasonable.	/0.5
Positive Comment:	
Areas for Improvement:	
Additional Resources: a variety of relevant and useful resources are included.	/0.5
NOT REQUIRED FOR THE IN-CLASS PRACTICE	
Possible suggestions for sources of additional information:	
Final Comments:	
<i>Total Points</i>	<i>/5</i>

HOMEWORK ASSIGNMENT

Key Issues

Considering the content you intend to cover and the student population you will be addressing, identify important issues to take into account prior to instruction. Consider actions you will need to take when planning this unit.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Curriculum Material

Textbook Section

Find and photocopy a chapter or section from a math textbook of your choosing. Provide a citation using the appropriate format as specified in the latest edition of the *Publication Manual of the American Psychological Association*.

Chapter Summary

Write a narrative description of the content. Include all important information and issues presented in the material.

Content Planning Worksheet

Complete the following planning worksheet for a two to three week segment of content you plan to teach. This segment probably would correspond to a chapter in the textbook you normally use in the class specified, but it could correspond to an entire unit in the textbook, or a few chapters taught together as a short unit, or selected parts of a chapter. However, please refer to a complete segment rather than a specific lesson or set of lessons. For example, if you generally give a test about every two or three weeks (or three or four times a quarter), think of all the material you teach between each test.

Content Planning Worksheet

Specific Directions

CONCEPTS

Please use this definition of concept:

- *Concepts are specific words or short phrases that refer to classes of objects or events that share some common defining attributes.*
- *Concepts involve three parts: a label, key attributes, and a range of examples.*

1. Identify the key *concepts* that you consider **critical** for understanding the content you plan to teach during the three-week interval indicated. Learning these concepts would, in your opinion, make the difference between mastery and nonmastery of the material you will cover.

List as many concepts as you feel are important, **up to ten**. Concepts you might target could include terms such as "epic," "voice," "sonnets," or "theme." However, *specific examples* of concepts would not be applicable. For example, the concept "epoch" might be exemplified by "ancient Greece," "ancient Rome," or "the Middle Ages." These examples would not qualify as concepts according to the definition used here.

2. List one or two key defining *attributes* for each concept. These attributes would enable discrimination between what is and is not an example of the concept.
3. Provide 2 or 3 *examples* of each concept AND when possible or applicable also include non-examples that further aid in discrimination of the critical features of the concept.

KEY CONCEPTS

- | | |
|--|---|
| 1. _____
2. _____
3. _____
4. _____
5. _____ | 6. _____
7. _____
8. _____
9. _____
10. _____ |
|--|---|

CONCEPT DESCRIPTIONS

<i>Concept</i>	<i>Attributes</i>	<i>Examples /Non Examples</i>
1		

2		
3		

* Use additional paper if needed

Tindal, G., Nolet, V., & Blake, G. (1992). Research, consultation, & teaching program training module No. 3: Focus of teaching and learning in content classes. Eugene, OR: University of Oregon, Behavioral Research and Teaching.

IMPORTANT IDEAS

Please list **up to three** ideas that you believe are critical to mastery of the content you will teach. Ideas are more general than specific concepts in that they represent unifying themes or topics. Please focus on ideas contained within the context of a single unit rather than global themes or topics that cut across the entire course. For example, in a unit on fossil fuels, you might want students to understand the idea that "Use of fossil fuels results in environmental damage in the form of increased greenhouse gasses and acid precipitation." This idea would be more context-specific than the global theme, "Humans interact with their environment in a variety of ways, with both positive and negative effects," which could apply to a wide range of applications across a science curriculum.

Please frame the important ideas you want students to learn as complete sentences, not phrases.

IMPORTANT IDEAS

1. _____

2. _____

3. _____

State Standards Alignment

Describe the alignment of this curriculum with the state standards. Refer to the Department of Education's website for an updated version of the state standards in your grade level and content area. Include as much information as is available from your state and/or content area.

Common Curriculum Goal	Content Standard	Benchmark Level:	Rationale for Including

* Use additional paper if needed.

Additional Resources

Please list additional resources related to the content of this instructional unit. State the source and provide a rationale for using this source for this unit.

Additional Resources for: _____	
Source	Rationale for Using

* Use additional paper if needed.

Instructional Planning and Curriculum Analysis Evaluation Form

Your Name: _____

Name of the person whose worksheet you are evaluating: _____

Please review the Content Planning Worksheet. Evaluate each section using the criteria provided. Write a positive comment and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Peer Review Evaluation	Instructor Evaluation (Do not write in these boxes)	Points Earned
Key Issues: substantial and significant key issues are unique and relevant to the unit. Positive Comment: Areas for Improvement:		/0.5
Curriculum Material 1. Textbook citation is correctly formatted. Positive Comment: Areas for Improvement:		/0.5
2. Chapter summary is complete and accurate. Important and relevant information is included. Positive Comment: Areas for Improvement:		/0.5
Concept Analysis 1. Concepts and attributes are clearly identified. Attributes are critical and important for understanding the concept. Positive Comment:		/1

Areas for Improvement:		
2. Examples and non-examples are clearly identified and reasonable. Examples help clarify the concept and attributes.		/1
Positive Comment:		
Areas for Improvement:		
State Standards Alignment		
1. Relevant information is provided relating the state standards to the unit.		/0.5
Positive Comment:		
Areas for Improvement:		
2. Curriculum is appropriately aligned with the state standards identified. Rationale for alignment is clear and reasonable.		/0.5
Positive Comment:		
Areas for Improvement:		
Additional Resources: a variety of relevant and useful resources are included.		/0.5
Positive Comment:		
Areas for Improvement:		
Final Comments:		
	Total Score	/5

Section 2: Instructional Delivery

CLASSROOM EXAMPLE

Key Issues

Concepts and Attributes
Change Ups and Transitions
Examples and Non-Examples
Scoring Rubrics
Note Taking
Rejoinders

Instructional Sequence

Verbal Presentation of the Instructional Delivery from the Math Video

The teacher begins the first instructional period by handing out the weekly assignment sheet, 7X, 7Y and 7Z. The students choose how much of the assignment sheet they will attempt; all students are required to do the 7X assignment. The students are asked to stand at their desks to physically demonstrate X and Y-axes and independent and dependent variables by moving arms and legs to illustrate the shapes. They extend their arms directly above their heads with their feet together to illustrate Y, they extend one hand and cry "help me, help me" with feet together to demonstrate the dependent variable. They hold their arms out to their sides with feet apart to show X and they hold their hands on hips with feet apart and exclaim "independent" in a low loud voice. The students are seated and the teacher introduces variables using the example of jumping jacks versus time, an exercise they completed earlier in the unit. They discuss the difference between dependent and independent variables. Instruction on creating graphs is presented from a Power Point presentation: Basic Rules for Graphing (see lesson materials). Students take notes from the presentation and create a graph from a table depicting miles and hours.

- Rules:
1. The dependent variable goes on the y-axis.
 2. The independent variable goes on the x-axis.
 3. Always label the variable for each axis.
 4. The x and y axes usually meet at point (0,0).
 5. Choose a scale that will fit the data you have for each variable.
 6. Each number along the x and y axes must be on a grid line.
 7. The numbers along each axis must be spaced evenly.
 8. Plot each point first by locating its value on the x-axis, then going up to its value on the y-axis.
 9. Only connect the dots on a graph with a line if all of the information along that line is true.

Students are given guided practice from the text: Chapter 2 problem 2 and problem 10. The students work on the assignment as the two teachers monitor and answer questions.

The second instructional period begins with a warm up exercise: "Making a Table From a Graph" while the teacher takes attendance. The teacher reviews information presented on day one

reviewing concepts and attributes by creating a concept map on the overhead projector. Students identify the concept coordinate graph with the attributes independent and dependent variables. Facts (rules) are listed below the map. Examples and non-examples of the concept are presented and discussed from an overhead. Students are introduced to the scoring rubric and score their own homework.

Accommodations and Modifications

Students may need to:

- receive pre-written notes.
- have problems or directions read aloud.
- receive directions with simplified wording or portions masked.
- be given graphic organizers, which are already filled in.
- be provided with pre-made graph paper with the X and Y-axes labeled.
- work in separate location.

High achieving students may need extra or different problems to solve that are more challenging and require more higher order intellectual operations.

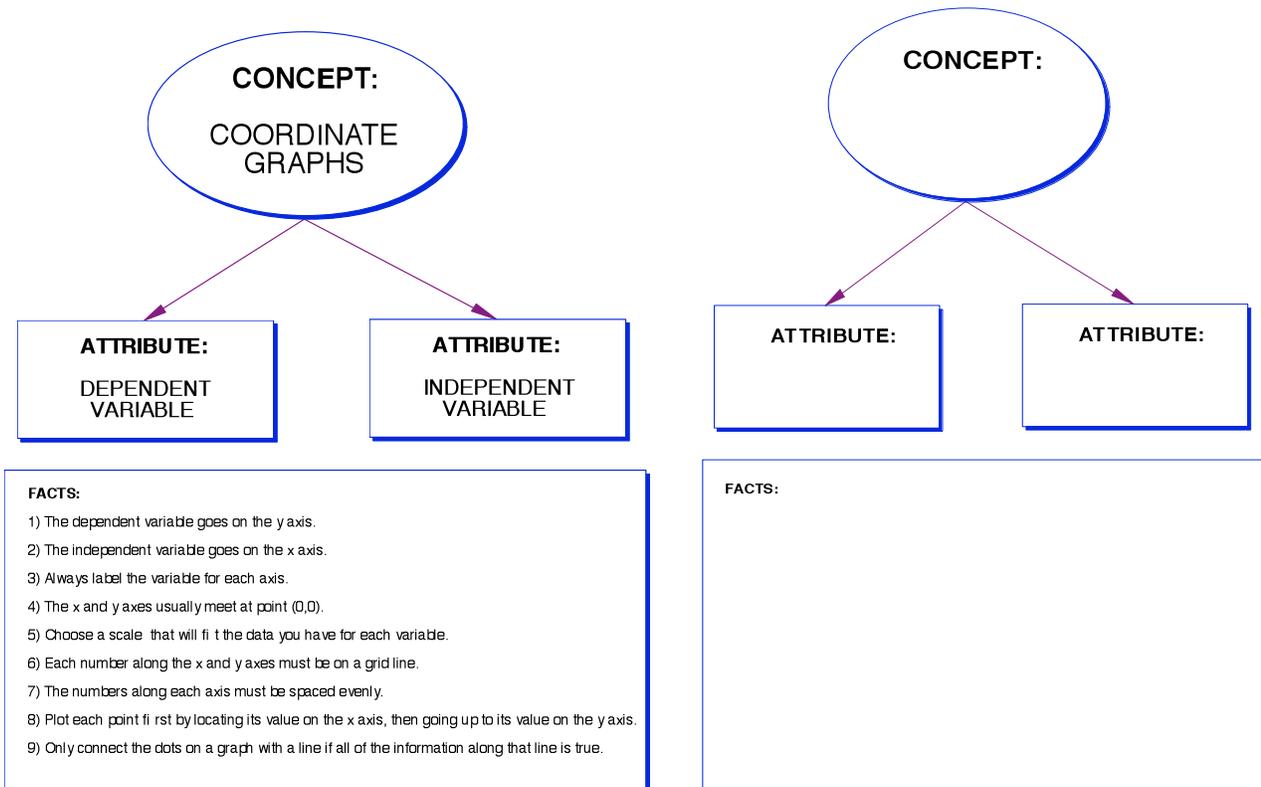
Lesson Materials

Graphic Organizer:

The concept and attributes are displayed in a concept map, which also includes blank lines for students to take notes on the related facts.

Teacher version:

Student version:



XYZ Assignment Sheet:

Week: 12/4-8/2000		Unit: Variables & Patterns			
Class: 7 th AM+PM Math		Objective: Manipulate, organize & analyze data			
Day:	B	A	B	A	B
	Monday	Tuesday	Wednesday	Thursday	Friday
	4	5	6	7	8
X	<ul style="list-style-type: none"> - Independent & Dependent Variables - "Basic Rules for Graphing" - Q 2, 10 - pp 27 & 31 - Check for Understanding 	X	<ul style="list-style-type: none"> - Review, Monday's Concepts - Activity: Organize & represent class size data (by class & total) 	X	<ul style="list-style-type: none"> - Assessment: Organize, Represent, and Analyze Shasta Data - Score meless with rubric
Y	<ul style="list-style-type: none"> - Q 1, 4, 6 - pp 26-30 	X	<ul style="list-style-type: none"> - Represent data by gender - Q 8, 11 - pp 31, 33 	X	<ul style="list-style-type: none"> - Time remaining, Do Problems 2.1, 2.2, 2.3, 2.4 & 2.5, pages

Warm Up Activity:

WARM UPS

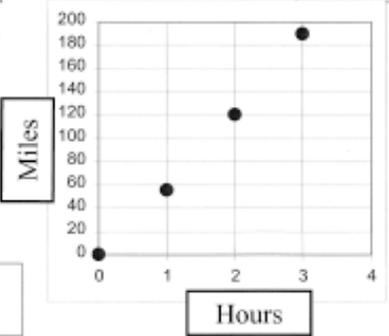
"Figure it out!"

Warm Up: VP#5

Points: 3

Use the graph to make a table:

Answer:



hours	0	1	2	3
miles	0	55	120	190

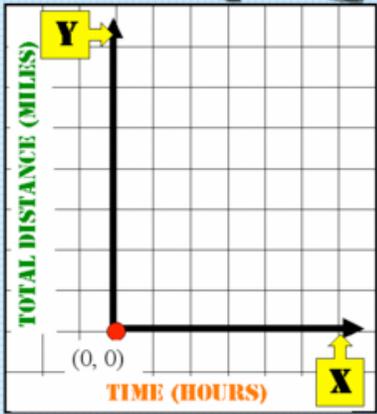
**Table for Warm Up and Graphing Rules Notes:
Hours vs. Miles**

Hours	Miles
0	0
1	10
2	26
3	31
4	44
5	49

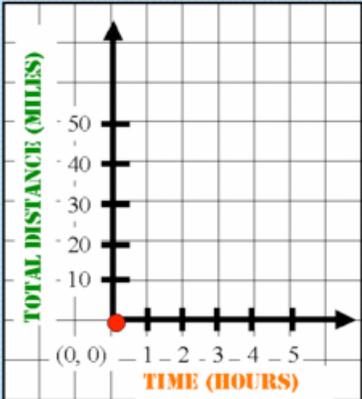
Basic Rules for Graphing-Note Taking:

Basic Rules for Graphing

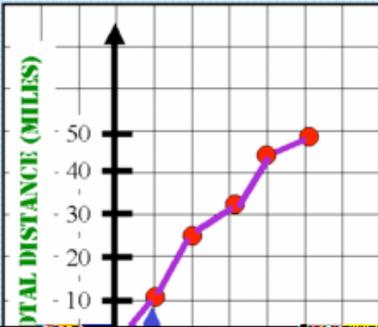
- 1) The **DEPENDENT VARIABLE** goes on the y axis
- 2) The **INDEPENDENT VARIABLE** goes on the x axis
- 3) Always label the variable for each axis
- 4) The x and y axes always meet at point (0, 0)



- 5) Choose a scale that will fit the data you have for each variable
- 6) Each number along the x and y axes *must* be on a grid line
- 7) The numbers along each axis *must* be spaced evenly



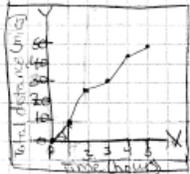
- 8) Plot each point first by locating its value on the x axis, then going up to its value on the y axis
- 9) *Only* connect the **dots** on a graph with a **line** if all of the



Notes

Basic Rules for Graphing

1. The **DEPENDENT** variable goes on the **Y** axis.
2. The independent variable goes on the **X** axis.
3. Always label the variable for each axis.



4. The X and Y axes usually meet at point 0,0.

5. Choose a scale that will fit the data you have for each variable.

6. Each number along the X and Y axes must be on a grid line.

7. The numbers along each axis must be spaced evenly.

8. Plot each point first by locating its value on the X axis, then going up to its value on the Y axis.

9. Only connect the dots on a graph if with a line if all of the information along that line is true.

Basic Rules for graphing

1. The dependent variable goes on the Y axis

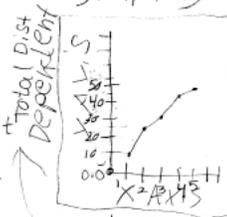
2. The independent variable goes on the X axis

3. Always label the variables. The X and Y axes always meet 0,0

4. Choose a scale that will fit data.

5. Data must be on a grid line

6. The numbers along the X axis must be spaced evenly



In dependent variables Time (Hours)

8. Plot each point first by locating its value on each axis then going up to its value on the Y axis

9. Only connect the dots on a graph with a line if all of the info is true

Student Notes:

Basic Rules for graphing

- The dependent variable goes on the Y axis

- The independent variable goes on the X axis

- Always label each variable for the axis it's on

- The X and Y axes usually meet at point 0,0

- Choose a scale that will fit the data you have for each variable.

- Each number on the X & Y axis must go on a grid line.

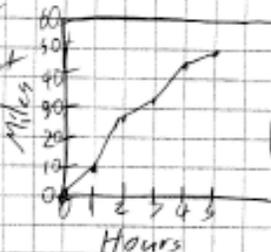
- The numbers must be spaced evenly

- Plot each point first by finding the X first then finding the Y

- Only connect the dots if the line is true.

Dependent Y

Independent X
Hours



**Homework
Problem 2 Chapter 2:**

2. Katrina's parents kept a record of her growth from her birth until her eighteenth birthday. Their data is shown in the table below.

Age (years)	Height (inches)
birth	20
1	29
2	33.5
3	37
4	39.5
5	42
6	45.5
7	47
8	49
9	52
10	54
11	56.5
12	59
13	61
14	64
15	64
16	64
17	64.5
18	64.5

- Make a coordinate graph of Katrina's height data.
- During which time interval(s) did Katrina have her largest "growth spurt"?
- During which time interval(s) did Katrina's height change the least?
- Would it make sense to connect the points on the graph? Why or why not?
- Is it easier to use the table or the graph to answer parts b and c?

**Homework Problem 10
Chapter 2:**

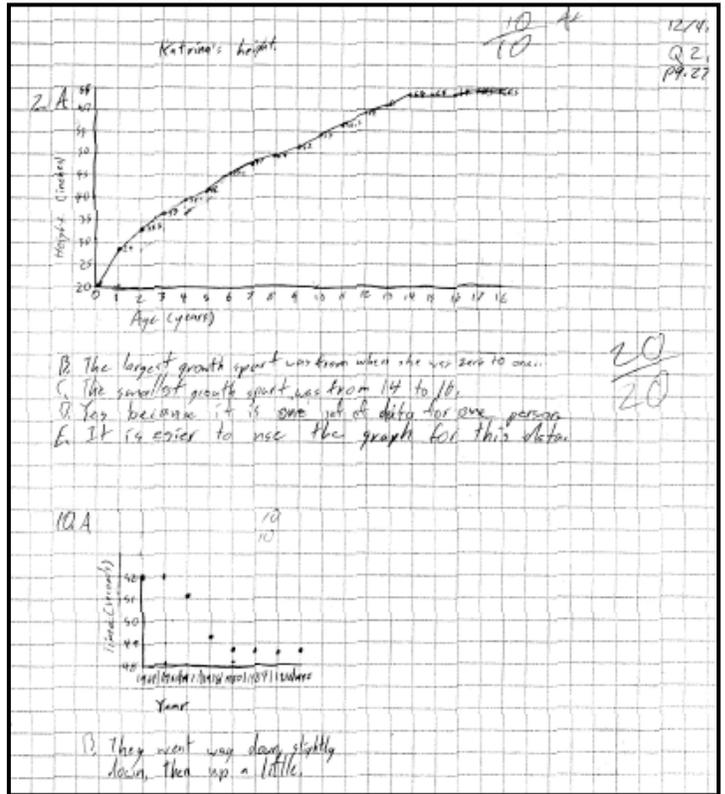
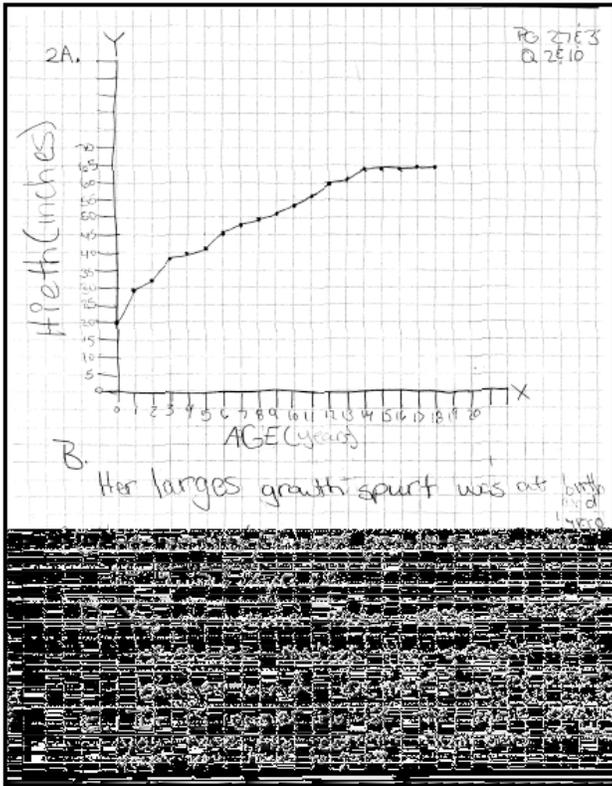
10. The following table shows the winners and the winning times for the women's Olympic 400-meter dash since 1964.



Marie-José Percec

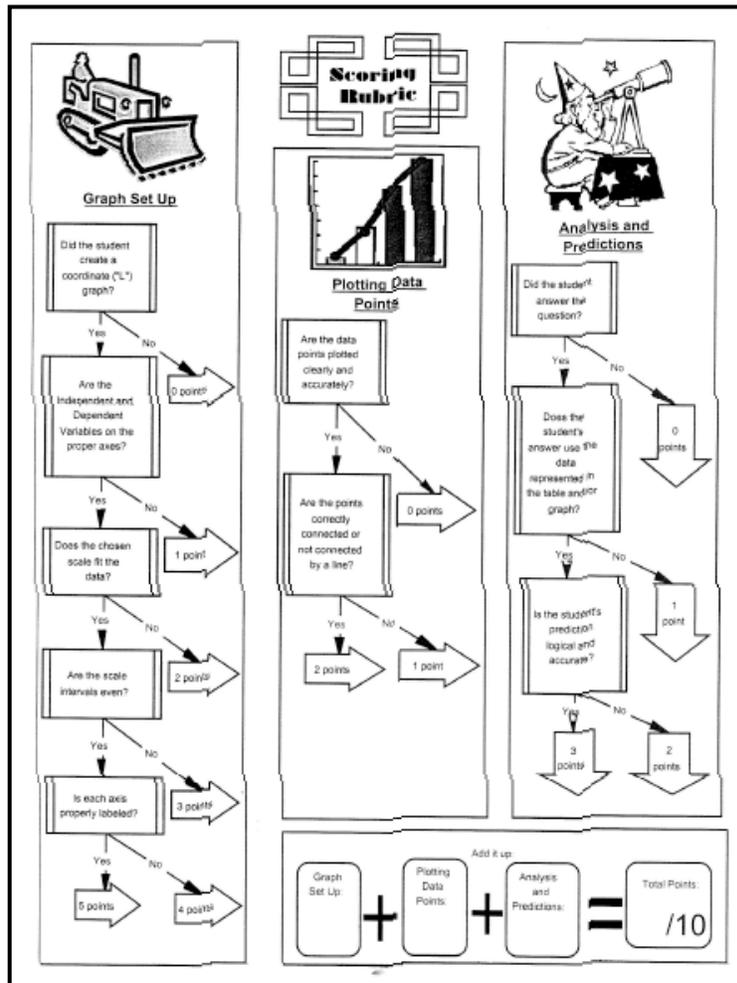
Year	Name	Time (seconds)
1964	Celia Cuthbert, AUS	52.0
1968	Colette Besson, FRA	52.0
1972	Monika Zehrt, E. GER	51.08
1976	Irena Szewinska, POL	49.29
1980	Marita Koch, E. GER	48.88
1984	Valerie Brisco-Hooks, USA	48.83
1988	Olga Bryzguina, USSR	48.65
1992	Marie-José Percec, FRA	48.83

- Make a coordinate graph of the (year, time) information given in the table. Be sure to choose a scale that allows you to see the differences between the winning times.
- What patterns do you see in the table and graph? For example, do the winning times seem to be rising or falling? In which year was the best time earned?



Student Homework:

Scoring Rubric:



In-Class Practice Exercise

Key Issues

Considering the content you intend to cover and the student population you will be addressing, identify important issues to consider prior to the presentation of instruction. Consider actions you will need to take when presenting this unit.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Instructional Sequence

Design an instructional plan for the presentation of the information provided. Include a range of examples and non-examples you will use to teach the concept(s) and attributes. Include examples of interactive teaching. Clearly identify problem-solving scenarios that reflect a range of intellectual operations.

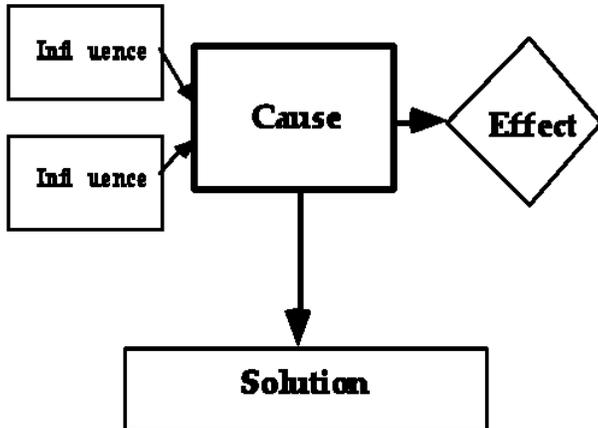
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

* Use additional paper if needed.

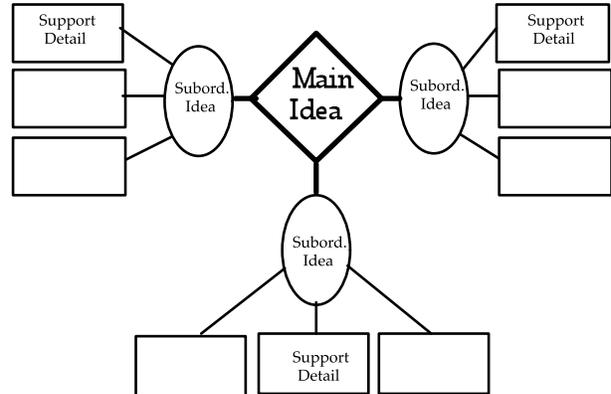
Graphic Organizer

A graphic organizer is a visual, non-linear representation of the linkages among knowledge forms. When designing a graphic organizer, it is important to emphasize the relationships and simplify the information to be presented. Below are several examples of different graphic organizers.

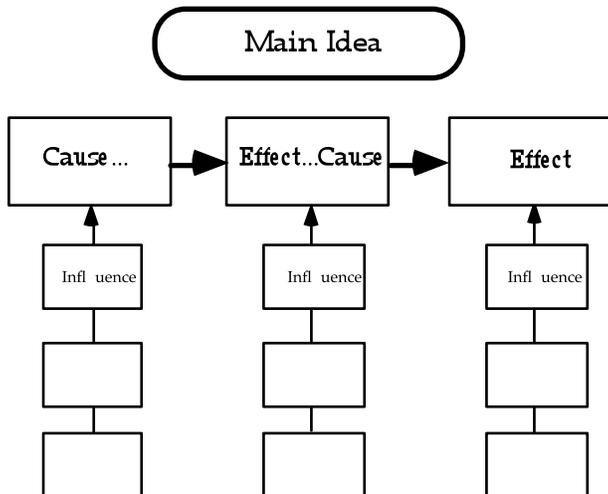
Problem and Solution Map



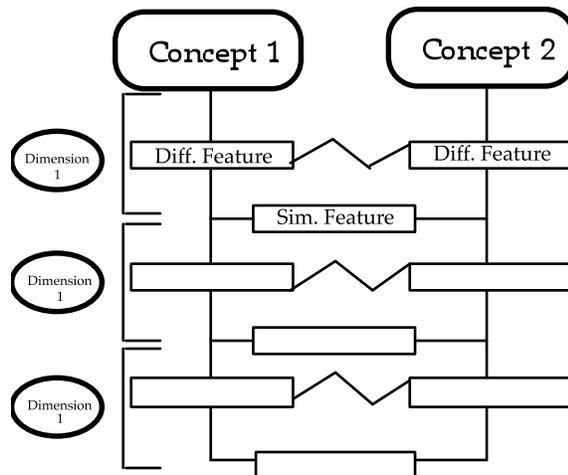
Descriptive or Thematic Map



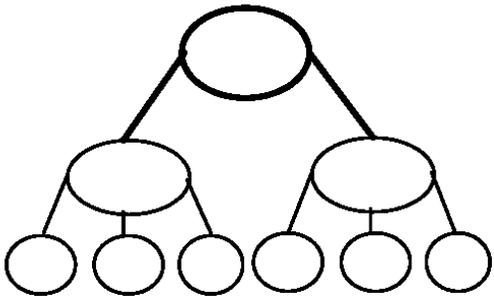
Sequential Episodic Map



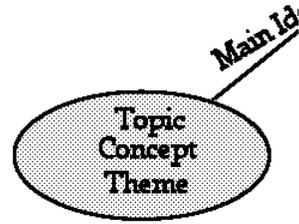
Comparative and Contrastive Map



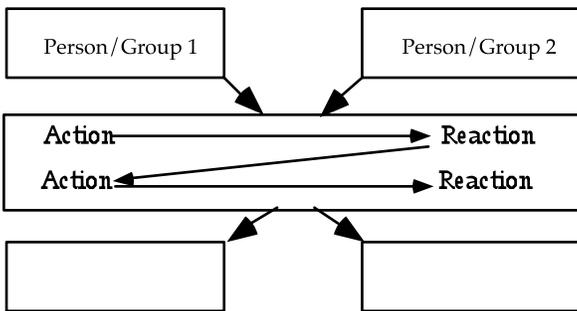
Network Tree



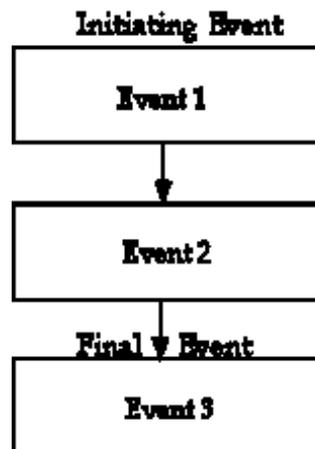
Spider Map



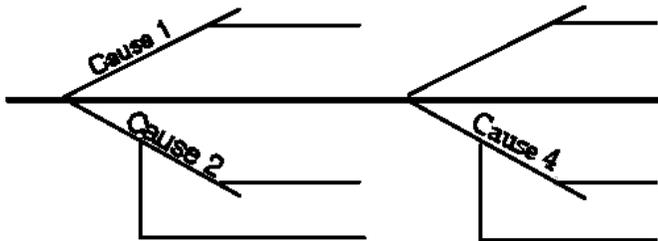
Human Interaction Outline



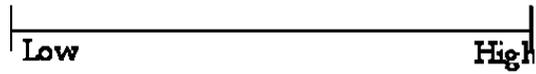
Series of Events Chain



Fishbone Map

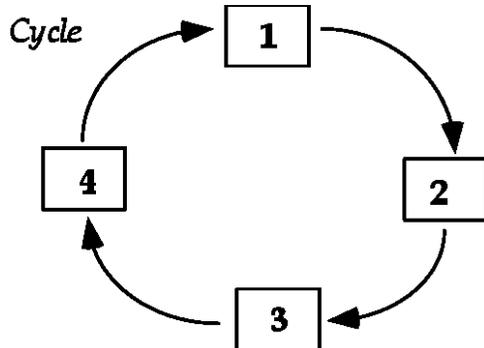


Continuum Scale

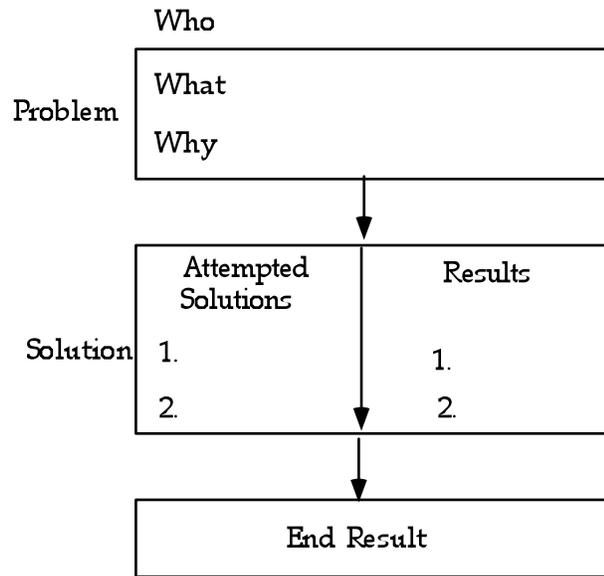


Compare-Contrast Matrix

Attribute 1		
Attribute 2		
Attribute 3		



Problem-Solution Outline



Tindal, G., Nolet, V., & Blake, G. (1992). Research, consultation, & teaching program training module No. 3: Focus of teaching and learning in content classes. Eugene, OR: University of Oregon, Behavioral Research and Teaching.

Graphic Organizer

Sketch a graphic organizer for the content provided that shows the key relationships among concept(s) and attributes. You may design your own or use one of the examples shown above.

Instructional Modifications

List instructional modifications you will make to accommodate the diverse community of learners within your classroom.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

* Use additional paper if needed.

**Instructional Delivery
Peer Evaluation Form**

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Instructional Delivery plan. Evaluate each section using the criteria provided. Write a positive comment and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Peer Review Evaluation	Points Earned
Key Issues: substantial and significant key issues are unique and relevant to the lesson described. Positive Comment: Areas for Improvement:	/0.5
Instructional Delivery 1. Conceptual framework (concepts, attributes, examples and non-examples) and graphic organizer are explicitly introduced. Positive Comment: Areas for Improvement:	/0.5
2. Instructional sequence flows in a logical order. Instructional sequence is rich and provides a detailed list of activities to be completed. Positive Comment: Areas for Improvement:	/1
3. Interactive teaching techniques are integrated into the instructional sequence with clearly identified intellectual operations that elicit higher order thinking. Positive Comment: Areas for Improvement:	/1

Graphic Organizer	
1. Concepts and attributes are clearly identified.	/0.5
Positive Comment:	
Areas for Improvement:	
2. Graphic organizer explicates the organization and structure of the content.	/0.5
Positive Comment:	
Areas for Improvement:	
Instructional Modifications	
1. Instructional modifications are clearly articulated in sentence format.	/0.5
Positive Comment:	
Areas for Improvement:	
2. Instructional modifications address the needs of diverse learners.	/0.5
Positive Comment:	
Areas for Improvement:	
Final Comments:	
Total Score	
/5	

HOMEWORK ASSIGNMENT

Key Issues

Considering the content you intend to cover and the student population you will be addressing, identify important issues to take into account prior to the presentation of instruction. Consider actions you will need to take when presenting this unit.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Instructional Sequence

Design an instructional plan for the presentation of the information you have chosen. Include a range of examples and non-examples you will use to teach the concept(s) and attributes. Clearly identify problem-solving scenarios that reflect a range of intellectual operations.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

* Use additional paper if needed.

Graphic Organizer

A graphic organizer is a visual, non-linear representation of the linkages among knowledge forms. When designing a graphic organizer, it is important to emphasize the relationships and simplify the information to be presented.

Sketch a graphic organizer for the content you have chosen that shows the key relationships among concept(s) and attributes. You may use a separate sheet of paper if you'd prefer.

Instructional Modifications

List instructional modifications you will make to accommodate the diverse community of learners within your classroom.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

* Use additional paper if needed.

Instructional Delivery Evaluation Form

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Instructional Delivery plan. Evaluate each section using the criteria provided. Write a positive comment and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Peer Review Evaluation	Instructor Evaluation (Do not write in these boxes)	Points Earned
<p>Key Issues: substantial and significant key issues are unique and relevant to the unit.</p> <p>Positive Comment:</p> <p>Areas for Improvement:</p>		/0.5
<p>Instructional Delivery</p> <p>1. Conceptual framework and graphic organizer are explicitly introduced.</p> <p>Positive Comment:</p> <p>Areas for Improvement:</p>		/0.5
<p>2. Instructional sequence flows in a logical order and provides a detailed list of activities to be completed.</p> <p>Positive Comment:</p> <p>Areas for Improvement:</p>		/1
<p>3. Interactive teaching techniques are integrated into the instructional sequence with clearly identified intellectual operations that elicit higher-order thinking.</p> <p>Positive Comment:</p>		/1

Areas for Improvement:		
Graphic Organizer		
1. Concepts and attributes are clearly identified.		/0.5
Positive Comment:		
Areas for Improvement:		
2. Graphic organizer explicates the organization and structure of the content.		/0.5
Positive Comment:		
Areas for Improvement:		
Instructional Modifications		
1. Instructional modifications are clearly articulated in sentence format.		/0.5
Positive Comment:		
Areas for Improvement:		
2. Instructional modifications address the needs of diverse learners.		/0.5
Positive Comment:		
Areas for Improvement:		
Final Comments:		
	Total Score	/5

Section 3: **Independent Activity**

CLASSROOM EXAMPLE

Key Issues

Collaborative Learning
Assigning Homework for Practice
Modeling
Guided Practice
Using Scoring Rubrics for Grading and Review
Monitoring Students

Independent Activity

Verbal Presentation of the Independent Activity from the Math Video

The teacher introduces the independent activity using the 7XYZ assignment sheet. The activity is intended to give the students practice organizing data into tables and coordinate graphs (concept). In creating a graph, students must determine which is the dependent variable and which is the independent variable (attributes). The teacher directs the students to work together as they do the Coordinate Graphing Activity using class lists as data. The students organize the data into a table and create a graph from the table. Students grade their own activities using the scoring rubric.

Accommodations and Modifications

Students may need to:

- have the problem or activity directions read to them.
- receive data that is highlighted or masked to help them sort for the pertinent data.
- be provided with pre-made graph paper with the X and Y-axis labeled.
- be given additional time.
- be given frequent breaks.
- receive simplified directions or problem wording.
- be allowed to work in a separate location.

High achieving students may need extra or different problems to solve that are more challenging and require more higher order intellectual operations.

Lesson Materials

Coordinate Graphing Activity:

Coordinate Graphing Activity

Use the class list data provided to accomplish the following task:

7X

1) Organize the data into a table displaying the number of students in each teacher's room during period 6B. Use the table to make a coordinate graph displaying the number of students in each teacher's room.

2) Organize the data into a table displaying the TOTAL number of students in class during period 6B. Use the table to make a coordinate graph displaying the total number of students in class during period 6B.

7Y

3) Further organize the data into tables and graphs displaying number of students per gender in each class, and the total number of students per gender during period 6B

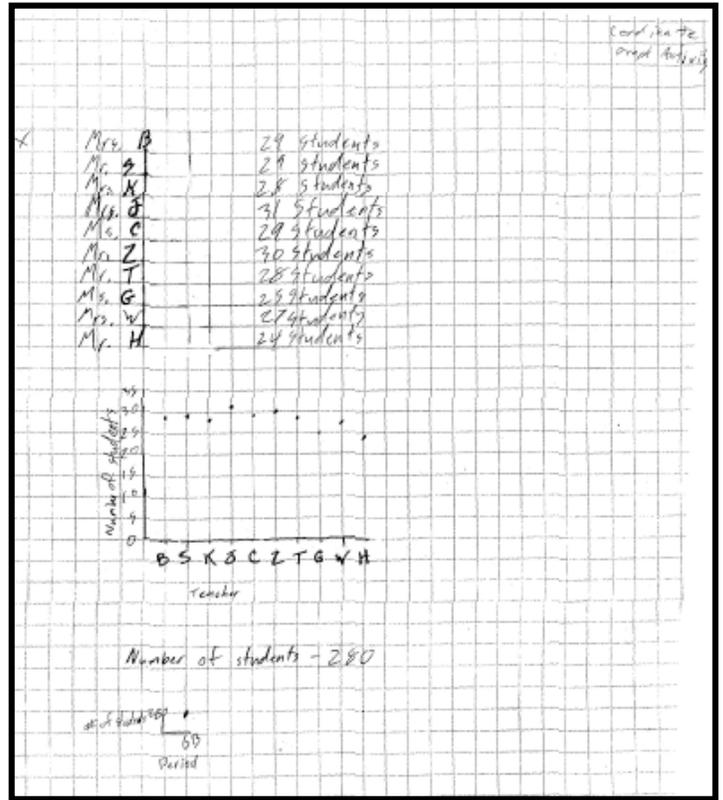
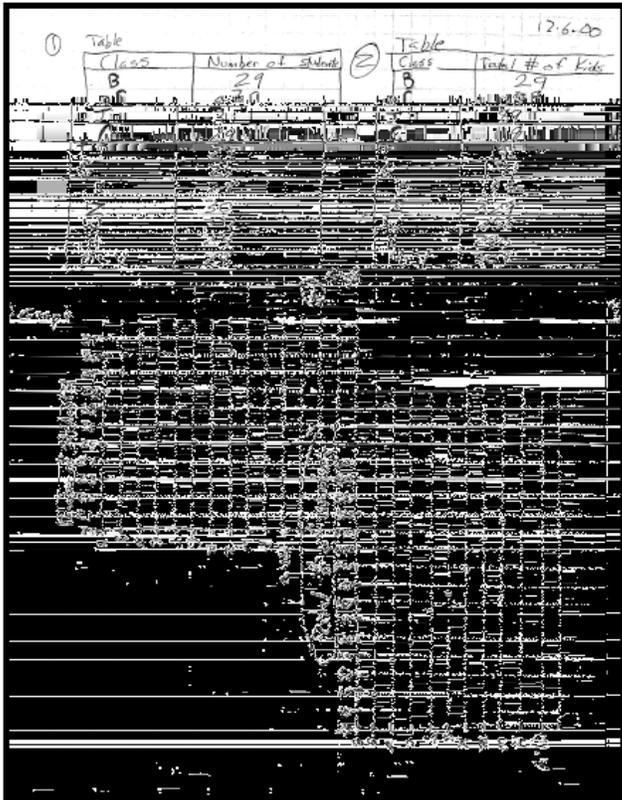
7Z

4) Further organize the data in tables and graphs to make some other comparison, such as students per class per house or students per house per grade, etc. Use your display to make at least one observation.

Activity Data:

Teacher	B	S	J	C	T	G	K	Z	W	H	V
Students											
1	ALICE	STEVE	GREGORY	REBECCA	MEGAN	MARY	LIBBETH	GREG	HOLLY	ALEXANDER	SHAWN
2	ARNOLD	BRANDON	JEFF	SALLY	GREGORY	SEAN	KATHY	COOY	HEATHER	RENE	MARIETTA
3	THOMAS	KAYLA	LAURA	DARLEEN	AMBER	KATE	CINDY	ALISSA	JENNIFER	GRAHAM	CORINNE
4	JESSE	SHANE	DANIEL	MARCE	ANDREW	STEVEN	CHRISTINA	VICTOR	ANGELA	KENDRA	BENJAMIN
5	DAVID	JEREMY	JAMES	FENEE	JEFFREY	KATHRYN	MARY	ROBIN	JONATHAN	JAMIE	JULIE
6	MICHELLE	MARK	JUSTIN	GEORGE	ADAM	RAY	AARON	VALERIE	PAT	MICHAEL	CATHRINE
7	TODD	JACOB	KEVIN	BETTY	TRAVIS	DANIELLE	SANDY	CLAIRE	ANITA	PATRICIA	ANDREA
8	JAN	DANA	WHITNEY	BARBARA	JO	JAKE	JORDAN	KRISTEN	GABRIEL	LINSEY	GLENN
9	CHRISTY	KRISTIN	KEITH	CASSANDRA	JOSEPH	JOE	TIFFANY	SARAH	COLIN	JILL	KRISTIN
10	MELISSA	CHRISTINA	AARON	BRIAN	SANDRA	LYNN	TONY	RAY	MEGHAN	LAURA	JAYSON
11	STACY	BOB	ROSE	MAXWELL	ALEXANDER	PAUL	JASON	PATRICIA	MARISSA	CARRE	RYAN
12	JAMES	ROBERT	GRACE	FAYE	CHRISTOPHER	DAWN	JENNIFER	JESSE	ALISON	NICHOLAS	GMEN
13	LAURA	JIMMY	ALAN	GEORGIA	JAKE	ANN	ERN	BARRY	OLIVER	MAROLS	MAGGE
14	JERRY	TAYLOR	WAYNE	WILLIS	RICHARD	IAN	ALICIA	PETER	AMY	WAYNE	DENSE
15	LINDA	CARL	ELISABETH	JACKIE	MICHAEL	LEANNE	LISA	BRENT	GEOFFREY	JASON	JACOB
16	BRIAN	ANDREW	EDWARD	NEAL	CHRISTIAN	JAN	NATHAN	SUSAN	SMUEL	WILL	THOMAS
17	SEAN	ADAM	NICOLE	JANICE	TYSON	THOMAS	KURT	JOSHUA	KELSEY	DAVID	ERIN
18	BRAD	IAN	ANDREW	EDWARD	ERICA	CHRISTY	DONALD	CATHRINE	ALEXANDRA	CAITLIN	CARRE
19	MARIE	BRUCE	NOEL	RYLAND	TIMOTHY	NICKOLAS	MARION	ANTHONY	LOUIS	NATHAN	CHARLES
20	JESSICA	JOEL	NOAH	SCOTT	WILLIAM	COREY	CARRE	DOUGLAS	DAVE	DARYL	JEREMY
21	KURSTIN	MATTHEW	CHARLES	JEFF	KEVIN	MALORY	DALE	HANNAH	CEOLE	NIKKI	NOELLE
22	JACK	ERIC	DWANE	DAMON	KIRK	SHANE	BEN	MELANIE	EMILY	APRIL	STEVEN
23	ERIC	SCOTT	LOUISIA	PAUL	LINDY	CHELSEA	ADAM	NATALIE	KIMBERLY	PHILIP	JOAN
24	RYAN	CASEY	VICTORIA	CHRIS	NICOLE	PHILLIP	TERRI	SETH	ERIK	AARON	APRIL
25	JOHN	JOHNNY	LESLIE	BRADLEY	AMANDA	ROBERT	JODI	CAROLYN	STEFAN		JANET
26	AMANDA	ALANA	INGRID	AL	SARAH		JEREMY	LEAH	KENNETH		JOE
27	TYLER	KATHY	KATE	BRAD	MARTIN		RICHARD	HOWARD	JOSHUA		LUCAS
28	COLE	ASHLEY	CARLA	COLIN	BROOKE		JULIE	MOLLY			CHAD
29	AMY	ANNA	RACHEL	DAVID				DANIEL			
30			DEREK					ASHLEY			
31			JESSICA								

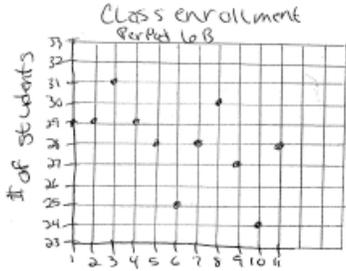
Student Work Samples-Independent Activity:



part 7X

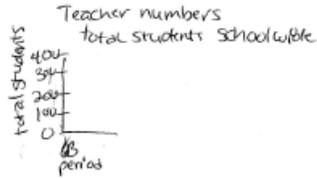
1)

Teacher	# of students
1 B	29
2 S	29
3 J	31
4 C	29
5 T	28
6 G	28
7 K	30
8 W	27
9 H	24
10 V	28



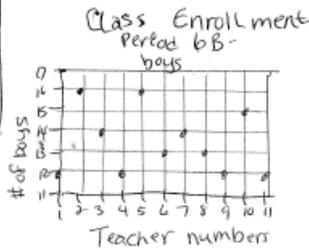
2)

Period	total # of student
1a B	308

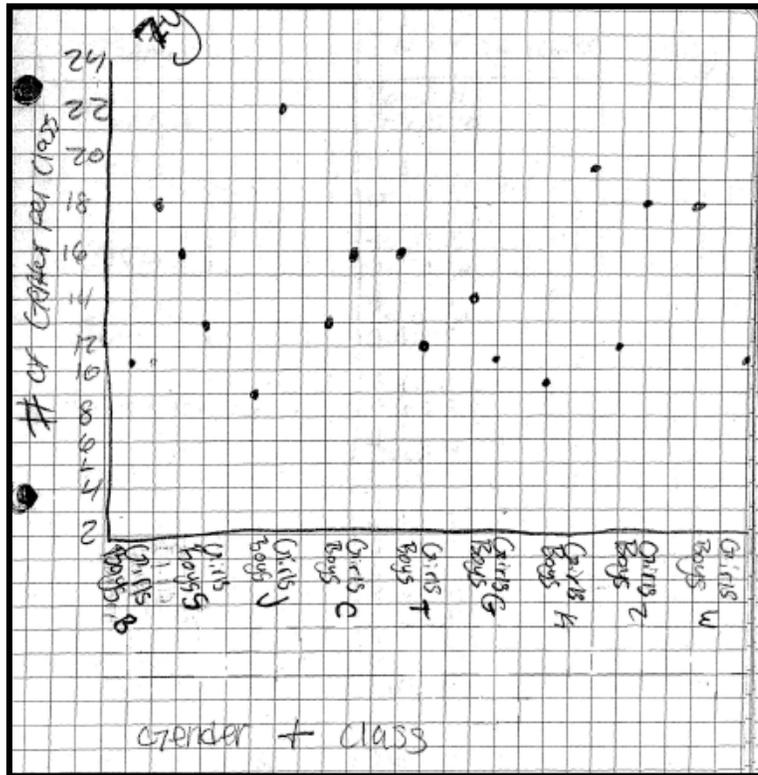


7p

teacher #	boys	girls
1	12	17
2	16	13
3	14	17
4	16	13
5	13	15
6	14	14
7	13	17
8	15	13
9	12	12
10	16	12



# of student	Totals # of students	Teacher
29	29	B
29	58	S
31	89	J
29	118	C
28	146	T
25	171	G
28	200	K
30	230	Z
27	257	H
24	281	V
28	309	



Intellectual Operations

INTELLECTUAL OPERATION	Refers to the behavior employed in using or manipulating knowledge forms.
Reiteration	<i>A verbatim reproduction of material that was previously taught.</i> <ul style="list-style-type: none">• The emphasis is on <u>verbatim</u>. The wording in the student's response must be very nearly identical to that presented in instruction.
Summarization	<i>Generation or identification of a paraphrase, rewording or condensation of content presented during instruction.</i> <ul style="list-style-type: none">• The emphasis here is on previous presentation of material. Therefore, summarization involves remembering information to a much greater extent than manipulating it.
Illustration	<i>Generation or identification of a previously unused example of a concept or principle.</i> <ul style="list-style-type: none">• The emphasis here is on use of an example that was not presented in instruction. In this respect, the student is expected to employ information about the attributes of a particular concept or principle rather than to simply remember whether or not an event exemplifies a knowledge form.
Prediction	<i>Description or selection of a likely outcome, given a set of antecedent circumstances or conditions that has not previously been encountered.</i> <ul style="list-style-type: none">• Again, the emphasis is on the <u>use</u> of information in a novel context rather than remembering a response from previous instruction.
Evaluation	<i>Careful analysis of a problem to identify and use appropriate criteria to make a decision in situations that require a judgment.</i> <ul style="list-style-type: none">• Evaluation focuses on decision-making. The student must first recognize or generate the options available and then use a set of criteria to choose among them.
Explanation	<i>Description of the antecedent circumstances or conditions that would be necessary to bring about a given outcome.</i> <ul style="list-style-type: none">• Explanation is the reverse of prediction. The student must use information about a concept or principle to work backwards from the circumstances presented and tell what happened to create it.

Some examples of interactions between knowledge forms and intellectual operations:

<p>Reiteration of a fact:</p>	<p><i>T:</i> Salem is the capital of Oregon. –What is the capital of Oregon? <i>S:</i> Salem is the capital of Oregon.</p>
<p>Summarization of a concept: element</p>	<p><i>T:</i> An element is a substance made of only one kind of atom. –Who can tell me what an element is? <i>S:</i> If you have some kind of matter and all of its atoms are exactly the same, that's an element.</p>
<p>Illustration of a concept: energy conservation</p>	<p><i>T:</i> We talked about some examples of energy conservation in the home. Can you think of an example we haven't talked about? <i>S:</i> We can recycle glass—it takes less energy to make glass from old glass than it does to make it from scratch, so that saves energy.</p>
<p>Prediction of a concept: Mass production (Three attributes: •assembly line •standardized parts •division of labor)</p>	<p><i>T:</i> Mass production is a system for rapidly creating large quantities of one kind of product that makes use of the assembly line and standardized parts. If we want to make a lot of a given product and we want to do it fast, what would jobs be like in this system? <i>S:</i> It seems like it would help if every person on the assembly line only had one kind of job to do; that way they'd get real fast at it.</p>
<p>Evaluation of a principle: The Law of Diminishing Returns: "As units of a variable factor of production are added to a fixed factor of production, at some point the resulting increases in output will begin to diminish in size."</p>	<p><i>T:</i> Farmer Jones has decided that if he can't double his profits from his dairy farm, he's going to sell it. Right now he's trying to figure out if he can meet his goal by increasing the milk output of his herd without buying any more cows. If you were Farmer Jones, what factors would you consider in deciding whether to sell or try to increase your cows' productivity? <i>S:</i> The number of cows is fixed. Obviously, the amount of milk a cow produces can't be increased indefinitely, so we'd need to know what they're producing now and how much it can be increased. . .</p>
<p>Explanation of a principle: If one link in an ecosystem's food chain is broken, the relationship among the organisms may be upset.</p>	<p><i>T:</i> The owners of vacation homes on Paradise Lake are very upset—in the past couple of years the mosquito population has increased so much that it has become impossible to stay outdoors for very long. They want to get rid of those mosquitoes. What should they do? <i>S:</i> Well, they shouldn't just run out and get they most powerful bug spray to kill 'em. They ought to try to figure out why the mosquitoes have increased. What eats mosquitoes? Frogs. Maybe something happened to the frogs. . .</p>

Tindal, G., Nolet, V., & Blake, G. (1992). Research, consultation, & teaching program training module No. 3: Focus of teaching and learning in content classes. Eugene, OR: University of Oregon, Behavioral Research and Teaching.

Independent Activity

On a separate piece of paper, design an independent activity for the content provided. Be sure to include higher order intellectual operations. Clearly format the assignment by including instructions and a scoring guide. The activity should be ready to use in a classroom setting.

Instructional Modifications

List instructional modifications you will make to accommodate the diverse community of learners within your classroom.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

* Use additional paper if needed.

**Independent Activity
Peer Evaluation Form**

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Independent Activity plan. Evaluate each section using the criteria provided. Write a positive comment and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Peer Review Evaluation	Points Earned
Key Issues: substantial and significant key issues are unique and relevant to the lesson described.	/0.5
Positive Comment:	
Areas for Improvement:	
Independent Activity	/1
1. Explanation provides a thorough description of the activity. Intellectual operations are explicitly stated.	
Positive Comment:	
Areas for Improvement:	/1
2. Independent activity is clearly linked to the concepts and attributes. Activity provides practice using higher order intellectual operations.	
Positive Comment:	
Areas for Improvement:	/0.5
3. Activity is appropriately formatted with directions. Activity is ready for distribution in a classroom.	
Positive Comment:	
Areas for Improvement:	

4. Scoring rubric clearly identifies expectations for completing the activity.	/1
Positive Comment:	
Areas for Improvement:	
Instructional Modifications	
1. Instructional modifications are clearly articulated in sentence format.	/0.5
Positive Comment:	
Areas for Improvement:	
2. Instructional modifications address the needs of diverse learners.	/0.5
Positive Comment:	
Areas for Improvement:	
Final Comments:	
<i>Total Score</i>	/5

Independent Activity

On a separate piece of paper, design an independent activity for the content you have chosen that aligns with the conceptual framework previously identified. Be certain to include higher order intellectual operations. Clearly format the task with well-articulated directions. Provide a scoring guide. Note: the final product should be in the form of a ‘ready to go’ student assignment, similar to the “Sample Student Assignment: Writing a Biography.”

Instructional Modifications

List instructional modifications you will make to accommodate the diverse community of learners within your classroom.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

* Use additional paper if needed.

Independent Activity Evaluation Form

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Independent Activity plan. Evaluate each section using the criteria provided. Write a positive comment and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Peer Review Evaluation	Instructor Evaluation (Do not write in these boxes)	Points Earned
Key Issues: substantial and significant key issues are unique and relevant to the unit. Positive Comment: Areas for Improvement:		/0.5
Independent Activity 1. Explanation provides a thorough description of the activity. Intellectual operations are explicitly stated. Positive Comment: Areas for Improvement:		/1
2. Independent activity is clearly linked to the concepts and attributes. Activity provides practice using higher order intellectual operations. Positive Comment: Areas for Improvement:		/1

3. Activity is appropriately formatted with directions. Activity is ready for distribution in a classroom.		/0.5
Positive Comment:		
Areas for Improvement:		
4. Scoring rubric clearly identifies expectations for completing the activity.		/1
Positive Comment:		
Areas for Improvement:		
Instructional Modifications		
1. Instructional modifications are clearly articulated in sentence format.		/0.5
Positive Comment:		
Areas for Improvement:		
2. Instructional modifications address the needs of diverse learners.		/0.5
Positive Comment:		
Areas for Improvement:		
Final Comments:		
	Total Score	/5

Section 4: Assessment

VIDEO MATERIALS

Key Issues

Performance Task
Test-Taking Environment
Teacher Monitoring
Instruction-Assessment Alignment
Individualized Assignments
Range of Performance
Problem Solving
Testing Concepts and Attributes

Assessment

Summary of Assessment from Video

The teacher requests quiet attention from the students and explains what they should do when they have completed the assessment. The instructions for the assessment are given to the students in the 7XYZ assignment format. Students are told they must work individually and teachers monitor students during testing, and answer questions. Students are given data of the number of lunches served at the school for each day during one week in October. The lunches include full price, and free and reduced lunches for the number served on a particular day. The 7X assignment asks students to organize the data into tables. The student must look at the data and find the total number of students having lunch on each day and then display this information in a table. Using this table, students must create coordinate graphs that display: (1) Number of students who had lunch each day during the nine day period, and (2) Total number of students who had lunch on all nine days. When creating the graph students must identify the attributes- which is the dependent and which is the independent variable. Students are illustrating ways to represent data (concept). The students answer three questions about the tables and graphs they created. The first two questions require students to evaluate the data by determining which day served the most and the least number of students. The third question asks students to determine the total number of lunches needed to serve all the students on any given day by evaluating the data and making a prediction. The 7YZ assignment gives students more practice representing data in tables and graphs (illustration) by substituting different variables. Questions for this assignment ask the student to make a prediction based on converting numbers to percentages from the graphs they created. The final question on the 7YZ assignment asks students to predict the cafeteria budget for one month and for one year by evaluating the cost of a meal (given) and the number of students served from the data. If students cannot complete the task by the end of the period they write "time" at the top of their papers. These students will be allowed to complete the assessment task at a later time. Teachers wrap up, collecting journals and homework. The class is dismissed.

Accommodations and Modifications

Students may need to:

- have the assessment or problem directions read aloud to them.
- receive data that is highlighted or masked to help them sort for the pertinent data.
- be provided with pre made graph paper with the X and Y-axis labeled.
- be given more time to complete the task.
- be given frequent breaks.
- receive assessment directions in simplified wording.
- work in a separate location.

High achieving students may need more challenging problems that require more critical thinking skills and higher order intellectual operations.

Lesson Materials

Coordinate Graphing Assessment:

7X: Coordinate Graphing Assessment

Use the data sheets provided to do the following activity:

1) Organize the data into a **table** displaying the total number of students who had lunch at Shasta each day for nine days.

Use the table to make a **coordinate graph** displaying the total number of students who had lunch at Shasta each day for nine days.

2) Organize the data into a **table** displaying the total number of students who had lunch at Shasta over a nine day period.

Use the table to make a **coordinate graph** displaying the total number of students who had lunch at Shasta over a nine day period.

3) Use the tables and graphs you have created to answer the following questions:

- a) On what day did the MOST students eat lunch?
- b) On what day did the LEAST number of students eat lunch?
- c) If you were in charge of planning the Shasta menu, how many meals would you plan to serve to students on any given day?

7Y/Z: Coordinate Graphing Assessment

Use the data sheets provided to do the following activity:

- 1) Organize the data into a **table** and a **coordinate graph** displaying the total number of students who had a free or reduced lunch *compared to* the total number of students who paid full price for lunch each day for nine consecutive days.

- 2) Organize the data into a **table** and a **coordinate graph** displaying the total number of students who had a free or reduced lunch *compared to* the total number of students who paid full price for lunch over a nine day period.

- 3) Use the tables and graphs you have created to answer the following questions:
 - a) Using only your graphs, what would say is the percentage of Shasta students who receive a free or reduced lunch out of the total number of students who have a school-made lunch each day?

 - b) There are about 500 students enrolled at Shasta. If the student population increased by 100 students, how many free and reduced lunches would you expect Shasta to serve on an average day?

 - c) If it costs \$.70 to serve a single meal, what would you budget for the cafeteria to spend on meals in an average month? In an average school year? (Do NOT consider the amount of money taken in, only consider what it would cost to provide the meals!)

Shasta Middle School

eodsum.rpt

Data for: 10/30/00 Daily Summary Report 10/30/00 13:15

Assessment Data:

SECTION I - LUNCHES SERVED

	%	Served	Wkrs	Guests	Total	Apprvd
Full-Price Lunches	22%	132	1		133	405 33%
Free Lunches	16%	94	1		95	131 73%
Reduced Lunches	8%	46			46	65 71%

Student Lunches Served	46%	272	2		274	
Non-Reimbursed Lunches		0				
Adult Lunches		8			8	

BREAKFAST SERVED

	%	Served	Wkrs	Guests	Total	Apprvd
Full-Price Breakfasts	2%	15			15	406 4%
Free Breakfasts	6%	37			37	128 29%
Reduced Breakfasts	2%	15			15	66 23%

Student Breakfasts Served	11%	67			67	
Non-Reimbursed Breakfasts		0				
Adult Breakfasts		4			4	

Data for: 10/31/00 Daily Summary Report 10/31/00 12:55

SECTION I - LUNCHES SERVED

	%	Served	Wkrs	Guests	Total	Apprvd
Full-Price Lunches	22%	132	1		133	406 33%
Free Lunches	18%	104	2		106	131 81%
Reduced Lunches	8%	46			46	65 71%
Student Lunches Served	47%	282	3		285	
Non-Reimbursed Lunches		0				
Adult Lunches		5			5	

BREAKFAST SERVED

	%	Served	Wkrs	Guests	Total	Apprvd
Full-Price Breakfasts	2%	13			13	405 3%
Free Breakfasts	6%	33	1		34	131 26%
Reduced Breakfasts	2%	11			11	65 17%
Student Breakfasts Served	10%	57	1		58	
Non-Reimbursed Breakfasts		0				
Adult Breakfasts		6			6	

Data for: 11/01/00 Daily Summary Report 11/01/00 13:03

SECTION I - LUNCHES SERVED

	%	Served	Wkrs	Guests	Total	Apprvd
Full-Price Lunches	19%	113	1		114	406 28%
Free Lunches	16%	92	2		94	132 71%
Reduced Lunches	6%	39			39	65 60%
Student Lunches Served	41%	244	3		247	
Non-Reimbursed Lunches		0				
Adult Lunches		15			15	

BREAKFAST SERVED

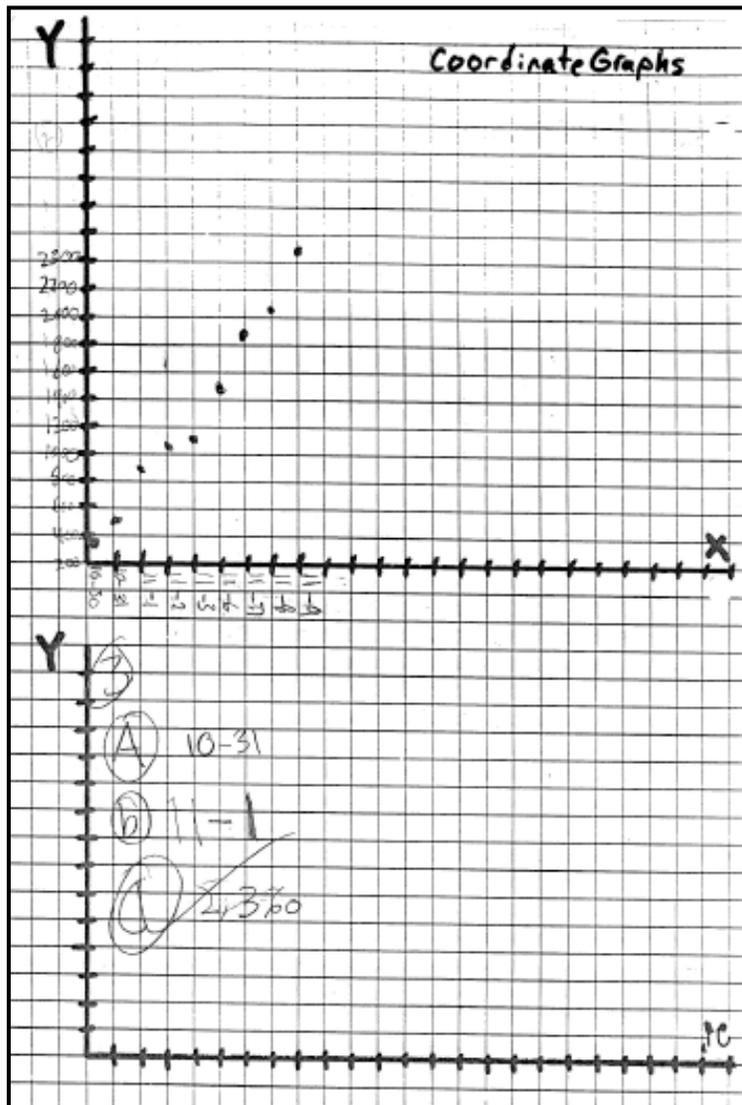
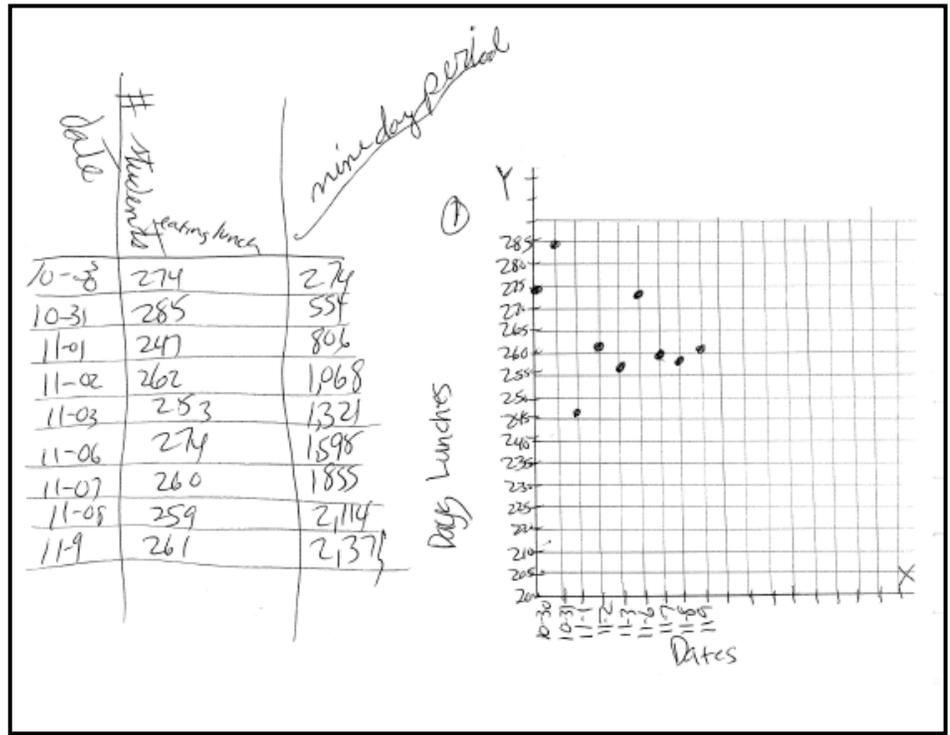
	%	Served	Wkrs	Guests	Total	Apprvd
Full-Price Breakfasts	2%	12			12	405 3%
Free Breakfasts	6%	33	1		34	132 26%
Reduced Breakfasts	2%	10			10	65 15%
Student Breakfasts Served	9%	55	1		56	
Non-Reimbursed Breakfasts		0				
Adult Breakfasts		3			3	

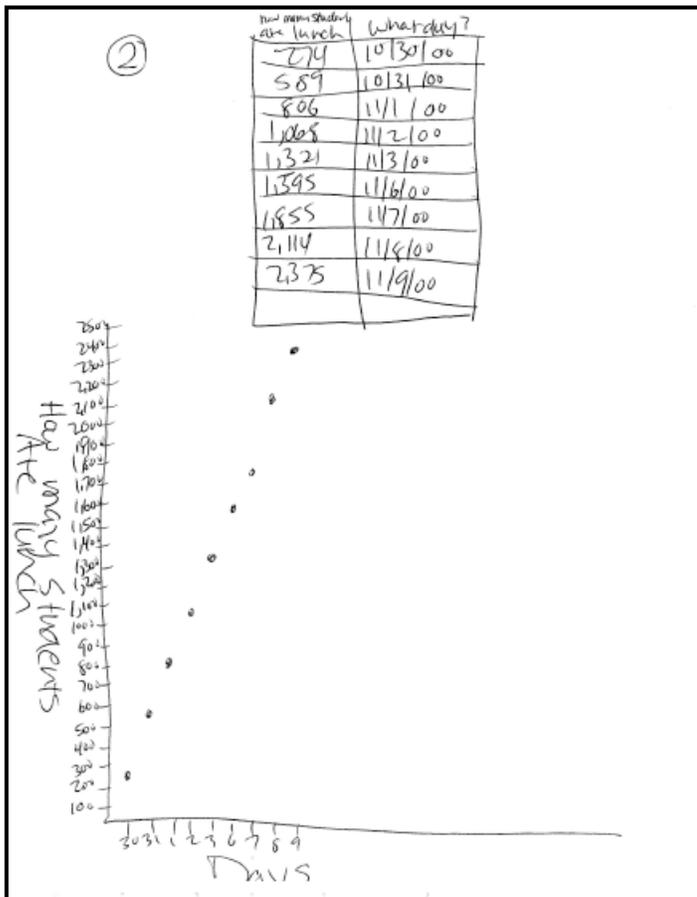
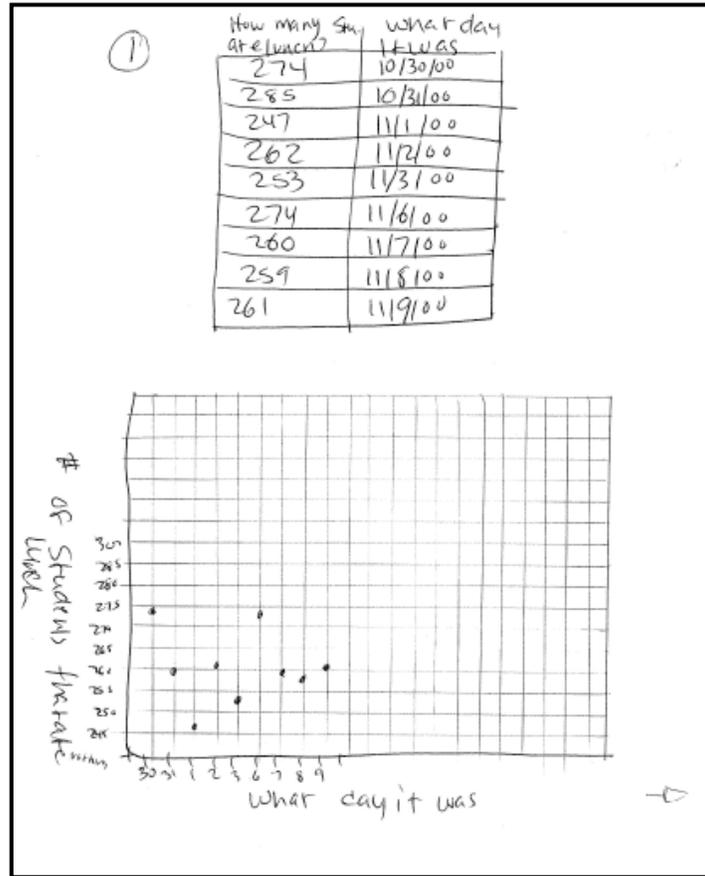
SECTION III - APPLICATIONS

	(# of Students)	
	Free	Reduced
Current	132	65
Enrollment: 602	22%	11%

Notes: Lunch -
 Breakfast -
 Cash Summary -

Student Work Samples:





- ③
- A) The most students ate lunch on the 31st of October. There were 285 students that ate lunch.
 - B) The Least students ate lunch on the 1st of November. Only 247 students ate lunch that day.
 - C) If I were in charge I would cook 295 meals a day. Just in case more kids buy lunches than they did for these (9) nine days.

Important Features of Classroom-Based Assessment

1. **It samples instruction representatively.**
This means that the tasks used in classroom-based assessment are a fair sample of the goals of instruction. It implies that classroom-based assessment tests what students are taught.
2. **It is technically adequate.**
This means it is *reliable* and *valid*. An assessment task that is designed and administered in a reliable manner is relatively free of potential sources of error that have nothing to do with the purpose of the task. A valid assessment task can be used to answer the question: “Did the students learn what I wanted them to learn?” Reliability and validity are extensively covered in Training Module 4: Focus on Assessment and Learning in Content Classes.
3. **It employs production responses.**
Students are expected to generate a product as a result of the assessment process. This product could be as simple as a few phrases or sentences or as elaborate as an essay. Production responses also may include spoken responses, such as may be elicited in a structured interview, as well as nonverbal constructions, such as maps, graphs, and drawings.
4. **It can provide information for making instructional decisions.**
The information obtained from classroom-based assessment can be used to evaluate the effectiveness of past instruction and to plan future instruction. Classroom-based assessment may or may not be useful for making other decisions, which may be social or political rather than educational (such as assigning grades or placing a student in special education).
5. **It can be used with a range of evaluation standards.**
This means that classroom-based assessment can be used to (a) compare an individual’s or group’s performance to that of a comparison group (norm-referenced evaluation), (b) estimate the extent to which content or skills have been mastered (criterion-referenced evaluation), or (c) chart an individual student’s progress over time (individual-referenced evaluation).

Nolet, V., Tindal, G., & Blake, G. (1992). *Research, consultation, & teaching program training module No. 4: Focus assessment and learning in content classes*. Eugene, OR: University of Oregon, Behavioral Research and Teaching.

Assessment Activity

On a separate piece of paper, design an assessment task that is oriented toward a specific intellectual operation (as described earlier). Be certain to include higher order intellectual operations. Clearly format the assignment by including instructions and a scoring guide. The assessment should be ready to present in a classroom setting.

Instructional Modifications

List instructional modifications you will make to accommodate the diverse community of learners within your classroom.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

* Use additional paper if needed.

**Assessment
Peer Evaluation Form**

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Assessment section. Evaluate each section using the criteria provided. Write a positive comment and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Peer Review Evaluation	Points Earned
Key Issues: substantial and significant key issues are unique and relevant to the lesson described. Positive Comment: Areas for Improvement:	/0.5
Assessment Task 1. Explanation provides a thorough description of the assessment. Intellectual operations are explicitly stated. Positive Comment: Areas for Improvement:	/1
2. Assessment task is aligned with instructional domain as defined by the instructional unit (review the instructional sequence and independent activity). Positive Comment: Areas for Improvement:	/1
3. Higher order intellectual operations are the primary focus of the assessment task. Positive Comment: Areas for Improvement:	/0.5

4. Assessment task is appropriately formatted with directions. Assessment task is ready for distribution in a classroom.	/0.5
Positive Comment:	
Areas for Improvement:	
5. Scoring rubric clearly identifies expectations for completing the assessment task.	/1
Positive Comment:	
Areas for Improvement:	
Instructional Modifications	
1. Instructional modifications are clearly articulated in sentence format and address the needs of diverse learners.	/0.5
Positive Comment:	
Areas for Improvement:	
Final Comments:	
<i>Total Score</i>	<i>/5</i>

Assessment Activity

On a separate piece of paper, design an assessment task that is oriented toward a specific intellectual operation (as described earlier). Be certain to include higher order intellectual operations. Clearly format the assignment by including instructions and a scoring guide. The assessment should be ready to present in a classroom setting.

Instructional Modifications

List instructional modifications you will make to accommodate the diverse community of learners within your classroom.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____

* Use additional paper if needed.

Assessment Evaluation Form

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Assessment section. Evaluate each section using the criteria provided. Write a positive comment and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Peer Review Evaluation	Instructor Evaluation (Do not write in these boxes)	Points Earned
Key Issues: substantial and significant key issues are unique and relevant to the unit. Positive Comment: Areas for Improvement:		/0.5
Assessment Task 1. Explanation provides a thorough description of the assessment. Intellectual operations are explicitly stated. Positive Comment: Areas for Improvement:		/1
2. Assessment task is aligned with instructional domain as defined by the instructional unit (review the instructional sequence and independent activity). Positive Comment: Areas for Improvement:		/1

3. Higher order intellectual operations are the primary focus of the assessment task.		/0.5
Positive Comment:		
Areas for Improvement:		
4. Assessment task is appropriately formatted with directions. Assessment task is ready for distribution in a classroom.		/0.5
Positive Comment:		
Areas for Improvement:		
5. Scoring rubric clearly identifies expectations for completing the assessment task.		/1
Positive Comment:		
Areas for Improvement:		
Instructional Modifications		
1. Instructional modifications are clearly articulated in sentence format and address the needs of diverse learners.		/0.5
Positive Comment:		
Areas for Improvement:		
Final Comments:		
	Total Score	/5

Section 5: **Teacher Reflection**

VIDEO MATERIALS

Key Issues

Open-Ended Formats
Strategies for Challenged Learners
Concepts and Attributes
Scoring Rubrics
Using Technology
Classroom Management
Linking Instruction to State Testing

Teacher Reflection

Summary of Teacher Reflection from Video

Reflecting on the completed unit, the two instructors debrief the unit plan to identify strengths and weaknesses of the instruction, activity, and assessment. The regular math teacher reiterates that the purpose of the unit was to prepare students for Algebra through understanding how to represent data in tables and graphs. He discusses the need for a range of assignments (7XYZ) that relate to different abilities of the students and the inherent difficulties in teaching in an inclusive school. The special education teacher adds the need for specific modification of the assignments for the low ability students. Both teachers agree the note taking exercise during the Power Point presentation was too long to hold student attention. Both instructors think that the rubric designed for this unit was a valuable assessment tool and helped to increase learning through review.

Please reflect on each issue thoughtfully and honestly. Your responses will be evaluated based on the thoroughness of your explanations. The *content* of your reflection (critique of your unit) will not be graded.

In-Class Practice Exercise

Key Issues

Considering the content you intend to cover and the student population you will be addressing, identify important issues to take into account at the end of an instructional unit.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Background Information

To evaluate a unit, you must first have an understanding of different types of validity that are important to consider. A brief introduction is presented below.

Validity

Internal Validity

- Indicates whether there is a causal relationship between the lesson inputs (instruction, activity, and assessment) and the observed outcomes (student performance).
- Can you identify a cause and effect relationship between your instruction and student success?
- Would the students have succeeded without your instructional plan?

External Validity:

- Associated with the generalizability of the outcomes.
- Can the knowledge or skills learned in this lesson be generalized across other activities or content?
- What inferences can be made about the student's abilities upon completion of this unit?

Social Validity

- Identifies the benefits and consequences of participation in this unit for individuals and groups of students in the future
- What is the value of learning this information outside of the classroom?
- Why should students learn the content?

Teacher Reflection

Upon conclusion of this unit, reflect on the strengths, weaknesses, internal validity, external validity, and social validity for three domains of the lesson: content, reading as an access skill, and writing as an access skill.

Content

Strengths: Consider the strengths of the unit you developed for the content provided.

Curriculum Analysis and Instructional Planning:

Instructional Delivery:

Independent Activity:

Assessment:

Weaknesses: Consider the aspects you would change or redesign for the unit you developed for the content provided.

Curriculum Analysis and Instructional Planning:

Instructional Delivery:

Independent Activity:

Assessment:

Internal Validity: Can you identify a cause and effect relationship between your instruction and student success?

Identify the domain of the instructional delivery and independent activity. Look at the sampling plan for the assessment. Is there alignment between the instruction/activity and the assessment? Does the rubric match the sampling plan? Does the rubric address important information covered in the domain of instruction? Thoroughly consider these issues.

External Validity: Can the knowledge or skills learned in this lesson be generalized across other activities or content areas?

If your students are successful on this unit, what else might they be successful in? Can the students extend their knowledge to other examples of the concept? Can the students apply their skills to other intellectual operations? Thoroughly consider these issues.

Social Validity: What are the benefits and consequences of participation in this unit for individuals and groups of students?

Is learning the information in this unit beneficial and/or harmful for the student? What conflicts might the student experience from learning this information? Is it important for the student to learn the information presented? Thoroughly consider these issues.

Reading as an Access Skill

Strengths: How does the students' ability to read positively affect their access or ability to succeed on the unit? Thoroughly consider this issue for each lesson component.

Instructional Delivery:

Independent Activity:

Assessment:

Weaknesses: How does the students' ability to read negatively affect their access or ability to succeed on the unit? Thoroughly consider this issue for each lesson component.

Instructional Delivery:

Independent Activity:

Assessment:

Internal Validity: Can you identify a cause and effect relationship between your instruction and student success?

Does the students' ability to read threaten the internal validity? Is it possible that a student's ability to read may influence the judgment about his/her content ability or knowledge? Thoroughly consider these issues.

External Validity: Can the knowledge or skills learned in this lesson be generalized across other activities or content areas?

What reading skills are developed during this unit? How can these skills generalize across other content areas? How does students' reading skill affect their ability to generalize what they've learned in the unit? Thoroughly consider these issues.

Social Validity: What are the benefits and consequences of participation in this unit for individuals and groups of students?

How does the reading involved in this unit affect the student socially? How might the reading skills you've taught affect the students socially? Thoroughly consider these issues.

Writing as an Access Skill

Strengths: How does the students' ability to write positively affect their access or ability to succeed on the unit? Thoroughly consider this issue for each lesson component.

Instructional Delivery:

Independent Activity:

Assessment:

Weaknesses: How does the students' ability to write negatively affect their access or ability to succeed on the unit? Thoroughly consider this issue for each lesson component.

Instructional Delivery:

Independent Activity:

Assessment:

Internal Validity: Can you identify a cause and effect relationship between your instruction and student success?

Does the students' ability to write threaten the internal validity? Is it possible that a student's ability to write may influence the judgment about his/her content ability or knowledge? Thoroughly consider these issues.

External Validity: Can the knowledge or skills learned in this lesson be generalized across other activities or content areas?

What writing skills are developed during this unit? How can these skills generalize across other content areas? How does students' writing skill affect their ability to generalize what they've learned in the unit? Thoroughly consider these issues.

Social Validity: What are the benefits and consequences of participation in this unit for individuals and groups of students?

How does the writing involved in this unit affect the student socially? How might the writing skills you've taught affect the students socially? Thoroughly consider these issues.

**Teacher Reflection
Peer Evaluation Form**

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Teacher Reflection section. This section will be evaluated using the scoring rubric provided. Use the Peer Review Evaluation form below as a guideline for evaluating the responses provided. Provide positive comments and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Scoring Rubric for Teacher Reflection

- 5 All issues were identified and addressed that related to the strengths, weaknesses, internal validity, external validity, and social validity for three domains of the lesson: content, reading as an access skill, and writing as an access skill. Practices or topics of reliability and validity were considered with specific details, examples, and references. Format of presentation is clear.
- 4 Most issues were identified and addressed that related to the strengths, weaknesses, internal validity, external validity, and social validity for three domains of the lesson: content, reading as an access skill, and writing as an access skill. Discussion was provided in specific terms but incomplete in the reference to specific practices or topics of reliability and validity.
- 3 Some issues were identified and addressed that related to the strengths, weaknesses, internal validity, external validity, and social validity for three domains of the lesson: content, reading as an access skill, and writing as an access skill. Discussion was provided in general terms or incompletely. Little reflection on specific practices or topics of reliability and validity.
- 2 Information was completed with brief statements.
- 1 Information was incomplete.

Peer Review Evaluation
Content: consider the discussion of the strengths, weaknesses, internal validity, external validity, and social validity.
Positive Comment:

Areas for Improvement:

Reading as an Access Skill: consider the discussion of the strengths, weaknesses, internal validity, external validity, and social validity.

Positive Comment:

Areas for Improvement:

Writing as an Access Skill: consider the discussion of the strengths, weaknesses, internal validity, external validity, and social validity.

Positive Comment:

Areas for Improvement:

Final Comments:

HOMEWORK ASSIGNMENT

Key Issues

Considering the content you intend to cover and the student population you will be addressing, identify important issues to take into account at the end of an instructional unit.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Teacher Reflection

Upon conclusion of this unit, reflect on the strengths, weaknesses, internal validity, external validity, and social validity for three domains of the lesson: content, reading as an access skill, and writing as an access skill. Respond to each section *on a separate piece of paper*.

Content

Strengths: Consider the strengths of the unit you developed for the content you chose.

Curriculum Analysis and Instructional Planning:

Instructional Delivery:

Independent Activity:

Assessment:

Weaknesses: Consider the aspects you would change or redesign for the unit you developed for the content you chose.

Curriculum Analysis and Instructional Planning:

Instructional Delivery:

Independent Activity:

Assessment:

Internal Validity: Can you identify a cause and effect relationship between your instruction and student success?

Identify the domain of the instructional delivery and independent activity. Look at the sampling plan for the assessment. Is there alignment between the instruction/activity and the assessment? Does the rubric match the sampling plan? Does the rubric address important information covered in the domain of instruction? Thoroughly consider these issues.

External Validity: Can the knowledge or skills learned in this lesson be generalized across other activities or content areas?

If your students are successful on this unit, what else might they be successful in? Can the students extend their knowledge to other examples of the concept? Can the students apply their skills to other intellectual operations? Thoroughly consider these issues.

Social Validity: What are the benefits and consequences of participation in this unit for individuals and groups of students?

Is learning the information in this unit beneficial and/or harmful for the student? What conflicts might the student experience from learning this information? Is it important for the student to learn the information presented? Thoroughly consider these issues.

Reading as an Access Skill

Strengths: How does the students' ability to read positively affect their access or ability to succeed on the unit? Thoroughly consider this issue for each lesson component.

Instructional Delivery:

Independent Activity:

Assessment:

Weaknesses: How does the students' ability to read negatively affect their access or ability to succeed on the unit? Thoroughly consider this issue for each lesson component.

Instructional Delivery:

Independent Activity:

Assessment:

Internal Validity: Can you identify a cause and effect relationship between your instruction and student success?

Does the students' ability to read threaten the internal validity? Is it possible that a student's ability to read may influence the judgment about his/her content ability or knowledge? Thoroughly consider these issues.

External Validity: Can the knowledge or skills learned in this lesson be generalized across other activities or content area?

What reading skills are developed during this unit? How can these skills generalize across other content areas? How does students' reading skill affect their ability to generalize what they've learned in the unit? Thoroughly consider these issues.

Social Validity: What are the benefits and consequences of participation in this unit for individuals and groups of students?

How does the reading involved in this unit affect the student socially? How might the reading skills you've taught affect the students socially? Thoroughly consider these issues.

Writing as an Access Skill

Strengths: How does the students' ability to write positively affect their access or ability to succeed on the unit? Thoroughly consider this issue for each lesson component.

Instructional Delivery:

Independent Activity:

Assessment:

Weaknesses: How does the students' ability to write negatively affect their access or ability to succeed on the unit? Thoroughly consider this issue for each lesson component.

Instructional Delivery:

Independent Activity:

Assessment:

Internal Validity: Can you identify a cause and effect relationship between your instruction and student success?

Does the students' ability to write threaten the internal validity? Is it possible that a student's ability to write may influence the judgment about his/her content ability or knowledge? Thoroughly consider these issues.

External Validity: Can the knowledge or skills learned in this lesson be generalized across other activities or content areas?

What writing skills are developed during this unit? How can these skills generalize across other content areas? How does students' writing skill affect their ability to generalize what they've learned in the unit? Thoroughly consider these issues.

Social Validity: What are the benefits and consequences of participation in this unit for individuals and groups of students?

How does the writing involved in this unit affect the student socially? How might the writing skills you've taught affect the students socially? Thoroughly consider these issues.

**Teacher Reflection
Evaluation Form**

Your Name: _____

Name of the person whose paper you are evaluating: _____

Please review the Teacher Reflection section. This section will be evaluated using the scoring rubric provided. Use the Peer Review Evaluation side of the form below as a guideline for evaluating the responses provided. Provide positive comments and areas for improvement. Once finished, sign and return the evaluation to the author of the paper. This evaluation will be submitted with the final draft of this section.

Scoring Rubric for Teacher Reflection

- 5 All issues were identified and addressed that related to the strengths, weaknesses, internal validity, external validity, and social validity for three domains of the lesson: content, reading as an access skill, and writing as an access skill. Practices or topics of reliability and validity were considered with specific details, examples, and references. Format of presentation is clear.
- 4 Most issues were identified and addressed that related to the strengths, weaknesses, internal validity, external validity, and social validity for three domains of the lesson: content, reading as an access skill, and writing as an access skill. Discussion was provided in specific terms but incomplete in the reference to specific practices or topics of reliability and validity.
- 3 Some issues were identified and addressed that related to the strengths, weaknesses, internal validity, external validity, and social validity for three domains of the lesson: content, reading as an access skill, and writing as an access skill. Discussion was provided in general terms or incompletely. Little reflection on specific practices or topics of reliability and validity.
- 2 Information was completed with brief statements.
- 1 Information was incomplete.

Peer Review Evaluation	Instructor Evaluation (Do not write in these boxes)
Content: consider the discussion of the strengths, weaknesses, internal validity, external validity, and social validity.	
Positive Comment:	

Areas for Improvement:	
Reading as an Access Skill: consider the discussion of the strengths, weaknesses, internal validity, external validity, and social validity.	
Positive Comment:	
Areas for Improvement:	
Writing as an Access Skill: consider the discussion of the strengths, weaknesses, internal validity, external validity, and social validity.	
Positive Comment:	
Areas for Improvement:	

Final Comments:	
<i>Total Score</i> <i>/5</i>	

Mathematics Training Module: References

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SUGGESTION SHEET

We would like to request your comments regarding this training module. Please use this response sheet to provide suggestions that may help us improve subsequent modules. We greatly appreciate your insights and perspectives.

Please return this suggestion sheet to Holly Vance in Educational Leadership, ED 170.

Curriculum Instruction Assessment Alignment: Science

1. What aspects of this training module are not clear to you? Please be specific, include a brief description, and note the page number.

2. How can we improve the content of this training module?

3. How can we improve the structure of this training module?

4. Other suggestions:

Glossary

Attribute: a defining characteristic of the concept; provides criteria for distinguishing between what is and what is not an example of the concept.

Concept: clusters of events, names, dates, objects, places, etc. that share a common set of defining attributes.

Example: positive description of the concept or attribute that aids in discrimination of the critical features of the concept; includes a wide range (far and near) of acceptable responses that describe or define the concept or attribute; far positive and near negative examples should be similar but differ based on the critical features that define the concept or attribute.

External validity: associated with the generalizability of the outcomes.

Fact: a simple association between names, objects, events, places, etc. that use singular exemplars.

Graphic organizer: a visual, non-linear representation of the linkages among knowledge forms.

Intellectual operation: classification of behaviors that are identifiable or observable; allows teacher to determine whether or not students are able to manipulate content area knowledge forms in meaningful ways.

Interactive teaching: dialogues between teachers and students to check for understanding; integrates critical thinking skills into instruction by modeling intellectual operations.

Internal validity: indicates whether there is a causal relationship between the lesson inputs (instruction, activity, and assessment) and the observed outcomes (student performance).

Knowledge form: form of information presented to learners; includes principles, concepts, and facts.

Non-example: negative description of the concept or attribute that aids in discrimination of the critical features of the concept; includes a wide range (far and near) of responses that would not describe or define the concept or attribute; far positive and near negative examples should be similar but differ based on the critical features that define the concept or attribute.

Principle: a consistent relationship among events, objects, or behaviors; indicates relationships among different facts or concepts.

Social Validity: identifies the benefits and consequences of participation in an activity (unit, lesson, assessment, etc.) for individuals and groups of students in the future.